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A MONOGRAPHIC STUDY OF RHUS AND ITS IMMEDIATE ALLIES IN NORTH AND CENTRAL AMERICA, INCLUDING THE WEST INDIES[1]

FRED ALEXANDER BARKLEY

Instructor in Botany, University of Montana

Formerly University Fellow and Assistant in Botany, Henry Shaw School of Botany and University College of Washington University

Formerly R. M. Balyeat Fellow in Allergy, University of Oklahoma and Washington University

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INTRODUCTION

The present study suggested itself to the author while engaged on some correlated taxonomic studies related to Dr. Ray M. Balyeat's work on the specificity of skin irritants produced by various plants, during which it became apparent that the various elements referred to the great Rhus-complex were so confused as to make phytochemical and dermatological studies in a like degree uncertain.

The excellent treatises of Engler (32)[1] and of Gray (40) form a most admirable basis for this study. Since their publication, however, extensive explorations and collections, especially in Mexico, have been made, as a result of which, and also of further study of old collections and differences in interpretations of generic and specific concepts, many new names and combinations have appeared. Some workers have regarded the Rhus-complex as composed of many comparatively small genera; others have considered it a "polymorphous" genus composed of a number of distinct sections or subgenera.

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[1] The numbers in parentheses refer to the assembled bibliography at the end of part I of this paper.

Critical studies of the various elements of the Anacardiaceae are now in progress and will be developed by the author eventually into a monograph of the entire family.

I. General Discussion

HISTORY[1]

The history of the group of species of the Anacardiaceae which Linnaeus included in his genus *Rhus* is long and interesting. Two members, now known as *Cotinus Coggygria* Scop. and *Rhus Coriaria* L., were known at least as early as classical antiquity for they figure in Theophrastus' 'Enquiry into Plants' (115). From Greek times they have been widely known because of their economic importance. The former was used in the preparation of dye and for its colored wood; the latter as a medicine, for seasoning, and for the tanning of hides. They were also included in most of the botanical treatises of medieval and Renaissance time. While as far back as 1591, *Cotinus* was called *Rhus Allobrogum* by L'Obel (66), the two were seldom treated together as *Rhus* until the eighteenth century, although their close affinity was apparently realized and in numerous works the treatment of one immediately followed the other.

Rhus Coriaria L. and *Cotinus Coggygria* Scop. were the only members of the group treated botanically before 1600. However, following the widespread exploration during the seventeenth and eighteenth centuries many additional species were reported.

In 1620, in Bauhin's 'Prodromos' (7), the North American plant, later designated as *Rhus glabra* L., was published, although erroneously reported as being from Brazil. Three years later in the same author's 'Pinax' (8), another North

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[1] For a more complete early history of *Rhus* see: Barkley, F. A. & E. D. Barkley. A brief history of *Rhus* to the time of Linnaeus. (Manuscript.)

American member, now known as *Rhus typhina* Torner, was also mentioned. *Rhus Copallina* L. appeared in Parkinson's 'Theatrum Botanicum' (78) in 1640 as *Lentisci Peruani Similia Molle Dicta.* The very closely related Asiatic species, *Rhus javanicum* L., *Rhus hypoleuca* Champ., and *Rhus punjabensis* Steward, did not enter botanical literature until later. *Rhus javanicum* L. was the first of these, having been described in Linnaeus' 'Species Plantarum' (63) in 1753.

The *Toxicodendron* element of the complex appeared first in Cornut's 'Canadensium Plantarum' (22) where a plant, evidently belonging to the species now termed *Toxicodendron radicans* (L.) Kuntze, was described and figured as *Edera trifolia Canadensis.* It again appeared in 1696 in Plukenet's 'Almagestum Botanicum' of the 'Opera Omnia Botanica' (82) as *Arbor americana alatis foliis fusco lacteo venenata.* Their Asiatic relatives, *Toxicodendron succedanea* (L.) Kuntze and *Toxicodendron vernicifera* (DC.) Barkl. & Barkl., the latter of which was long confused with *Toxicodendron Vernix* (L.) Kuntze, were reported in 1712 in Kaempfer's 'Amoenitatum Exoticarum' (53) under the names *Fari no ki* and *Sitz dsju* respectively.

The four African species of the Rhus-complex, which form the basis for the section GERONTOGEAE of Engler, appeared botanically in 1696 in Plukenet's 'Almagestum Botanicum' of his 'Opera' (82).

Metopium Brownei (Jacq.) Urb. first appears with description as *Terebinthus maxima, pinnis paucioribus majoribus atque rotundioribus, fructo sparso,* in 1696, in Sloane's 'Catalogus Plantarum, quae in Insula Jamaica, sponte proveniunt . . .' (102), and was beautifully illustrated in 1725 in volume two of the same author's 'Natural History of Jamaica' (103).

The only known species of *Actinocheita* (5) was first published as *Rhus filicina* by de Candolle in his 'Prodromus' (18) in 1825, later by Sessé & Mociño (101) as *Rhus Tetlatziam,* and by Turczaninow (121) as *Rhus potentillaefolia.* It has been collected so infrequently that its distinctive characters have been overlooked, and as a result it has been long included in *Rhus.*

Malosma was first described from California as *Rhus laurina* Nuttall ex Torrey & Gray (119) in 1838. In 1842 Walpers (122) transferred it to *Lithraea,* which genus, however, differs from *Malosma* in having ten stamens. Engler (32) treated it as *Rhus laurina,* but he added Nuttall's manuscript name for it, *Malosma laurina,* as a synonym.

There are several elements of *Rhus* found in North America, which, unlike *Rhus glabra* L., *Rhus typhina* Torner, and *Rhus Copallina* L., differ markedly from the type and in part have received various generic designations. The first known was that which has been variously segregated generically under the names *Turpinia* (Rafinesque, 1808 [85]), *Lobadium* (Rafinesque, 1819 [86]), and *Schmaltzia* (Desvaux, 1813 [28]). This element appeared with the publication of one of its species, *Rhus aromatica* Ait., as *Myrica trifoliata foliis ternatis dentatis* in Linnaeus' [Printz' 'Plantae Africanae Rariores' in] 'Amoenitates Academicae' (83) in 1760. Its very diverse western ally, *Rhus trilobata* Nutt., was published in Torrey and Gray's 'Flora of North America' (119).

Another element somewhat closely allied to *Rhus aromatica,* which has been variously segregated as *Rhoeidium,* appeared with the publication of its single species, *Rhus microphylla* Engelm., in Asa Gray's 'Plantae Wrightianae' (38) in 1852. The group of related species from the west coast of North America that has been variously segregated as *Styphonia* (Nuttall ex Torrey & Gray, 1838 [119]) and *Neostyphonia* (Shafer, 1908 [14]) was first reported with the publication of *Rhus mollis* by Humboldt, Bonpland, and Kunth (58) in 1824. This was followed in 1838 by *Styphonia integrifolia* Nuttall in Torrey and Gray's 'Flora of North America' (119). *Rhus Lentii* was subsequently described by Kellogg (54) in 1863 and *Rhus ovata* by Watson (123) in 1885. A group of southwestern and Mexican relatives of *Rhus integrifolia* (Nutt.) Benth. & Hook., having pinnately compound leaves, entered botanical literature in 1842 with the publication of *Rhus Schiedeana* Schlecht. (99) of Mexico. Another species of Texas and New Mexico was published in 1850 almost simultaneously, as *Rhus virens* Lindh. (37) and *Rhus sempervirens* Scheele (98). In 1858, *Rhus ciliolata* Turcz. (121) from Mexico was described.

With further exploration and collection in Mexico more and more species were reported. A little-worked, poorly known, but nevertheless distinctive assemblage of species is the group which varies geographically and morphologically around the Mexican plant described in 1830 by Schlechtendal and Chamisso (99) as *Rhus terebinthifolia.* The next of this group to be described as a species was *Rhus Palmeri* Rose (89), from Sonora, Mexico. More study and further collections have led to the publication of several new species since 1900.

As will be noted from the accompanying chart (table I), Tournefort (120), in 1700, disregarding *Metopium* and the African species, distributed the remaining known members of this complex into three genera: *Rhus* including *Rhus Coriaria*

TABLE I

GENERIC CONSIDERATIONS BY VARIOUS WORKERS OF *RHUS* AND ITS IMMEDIATE ALLIES (EXCLUSIVE OF MELANOCARPAE AND GERONTOGEAE ENGL.). THE "ELEMENTS" IN THIS COMPLEX ABOVE THE RANK OF SPECIES ARE LISTED; THOSE TREATED AS PART OF THE GENUS *RHUS* ARE INDICATED BY A CIRCLE (○); IF TREATED AS GENERICALLY DISTINCT, BY A CROSS (X).

AUTHOR	*Rhus*	*Pseudosumac*	*Styphonia*	*Pseudoschmaltzia*	*Rhoeidium*	*Lobadium*	*Actinocheita*	*Malosma*	*Toxicodendron*	*Cotinus*	*Metopium*
1700 Tournefort (120)*	○	....	....	....	....	....	....	....	X	X	....
1753 Linnaeus (63)	○	....	....	....	....	....	....	....	○	○	○
1759 Linnaeus (65)	○	....	....	....	....	....	....	....	○	○	○
1766 Crantz (25)	○	....	....	....	....	....	....	....	○	○	....
1768 Miller (72)	○	....	....	....	....	X[1]	....	....	X	○	....
1785 Marshall (70)	○	....	....	....	....	○	....	....	X[2]	....	....
1789 Aiton (2)	○	....	....	....	....	○	....	....	○	○	....
1794 Moench (73)	○	....	....	....	....	....	....	....	X	X	....
1803 Michaux (71)	○	....	....	....	....	○	....	....	○	....	....
1806 Mirbel (11)	○	....	....	....	....	....	....	....	○	○	○
1806 Lamarck & Poiret (60)	○	....	....	....	....	○	....	....	○	○	○
1813 de Candolle (17)	○	....	....	....	....	....	....	....	○	○	....
1814 Pursh (84)	○	....	....	....	....	○	....	....	○	....	....
1819 Rafinesque (86)	○	....	....	....	....	X[3]	....	....	X	....	....
1820 Roemer & Schultes (88)	○	....	....	....	....	○	....	....	○	○	○
1824 Torrey (117)	○	....	....	....	....	○	....	....	○	....	....
1825 Sprengel (110)	○	....	....	....	....	○	....	....	○	○	○
1825 de Candolle (18)	○[4]	....	○[4]	....	....	○[5]	○[4]	....	○[4]	○[5]	○[5]

TABLE I (Continued)

AUTHOR	*Rhus*	*Pseudosumac*	*Styphonia*	*Pseudoschmaltzia*	*Rhoeidium*	*Lobadium*	*Actinocheita*	*Malosma*	*Toxicodendron*	*Cotinus*	*Metopium*
1826 Torrey (118)	○	....	....	....	....	○	....	....	○	....	....
1830 Hooker (49)	○[4]	....	....	....	....	○[5]	....	....	○[4]	....	....
1832 Don (30)	○[4]	....	○	....	....	○[5]	○[4]	....	○[4]	○[5]	○[5]
1838 Torrey & Gray (119)	○[6]	....	X	....	....	○[7]	....	○[7]	○[6]	○[7]	....
1840 Hooker & Arnott (50)	○	○	....	....	....	○	....	....	○	....	....
1841 Steudel (113)	○	○	○	....	....	○	○	....	○	○	○
1842 Walpers (122)	○	....	....	....	....	○	....	X[8]	○	....	....
1842 de Schlechtendal (99)	....	○	....	○	....	○	....	....	○	....	....
1845 Wood (125)	○	....	....	....	....	○	....	....	○	○	....
1846 Gray (35)	○	....	....	....	....	....	....	....	○	○	....
1848 Gray (36)	○[4]	....	....	....	....	○[5]	....	....	○[4]	....	....
1849 Nuttall (75)	....	....	X	....	....	....	....	....	....	X	○
1859 Cooper (21)	○	....	X	....	○	....	....	X[8]	○	....	○
1860 Chapman (19)	○	....	....	....	....	○	....	....	○	○	○
1862 Bentham & Hooker (9)	○	....	○	....	....	....	....	○	....	....	....
1866 Grisebach (46)	○	....	....	....	....	....	....	....	....	....	○
1869 Koch (56)	○[4]	....	....	....	....	○[5]	....	....	○[5]	X	....
1877 Wood (126)	○	....	....	....	....	○	....	....	○	○	....
1877 Lavallée (61)	○	....	....	....	....	○	....	....	○	○	....
1878 Rothrock (90)	○	....	....	○	....	○	....	....	○	....	....
1879 Hemsley (48)	○	○	○	○	○	○	○	....	○	....	....
1883 Engler (32)	○[10]	○[10]	○	○[10]	○[10]	○[10]	○[10]	○[20]	○[20]	X	X
1888 Sessé & Mociño (101)	○	....	○[10]	....	....	○	○	....	○	....	....
1889 Wood & Willis (127)	○	....	....	....	....	○	....	....	○	○	○
1891 Sargent (95)	○	....	....	....	....	....	....	....	○	....	X
1891 Kuntze (59)	○[1]	○[1]	....	○[1]	○[1]	○[1]	○[1]	○[1]	○[1]	....	....
1891 Coulter (23)	○	....	○[1]	○	○	○	....	....	○	○	....
1892 Patterson (79)	○	....	....	○	○	○	....	○	○	○	○
1892 Engler (33)	○[10]	○[10]	○	○[10]	○[10]	○[10]	....	....	○[20]	X	X
1892 Sargent (96)	○	....	○[10]	....	....	....	....	....	○	X	○
1892 Dippel (29)	○[11]	....	○	....	....	○[12]	....	....	○[7]	X	....
1893 Koehne (57)	○[13]	....	....	....	....	○	....	....	○[5]	X	....
1894 Britton (12)	○	....	....	....	....	○	....	....	○	X	....
1897 Gray (40)	○[14]	....	○[14]	○[14]	○[14]	○[14]	....	○[14]	○[14]	○[5]	○[5]
1901 de Dalla Torre & Harms (26)	○	○	○	○	○	○	○	○	○	X	X
1901 Britton (13)	○	....	....	....	○	○	....	....	○	X	....
1903 Small (104)	○[15]	....	....	○[15]	○[15]	○[15]	....	....	X[16]	X	X
1905 Greene (42-44)	○	....	....	....	X	X[9]	....	....	X	....	....
1905 Sargent (97)	○	....	....	....	....	....	....	....	○	X	X
1906 Piper (80)	○	....	○	....	....	....	....	....	○	....	....
1906 Loesener (67)	○	○	○	○	....	....	○	....	....	....	....
1907 Schneider (100)	○[17]	....	....	....	....	○[18]	....	....	○[7]	X	....
1908 Gray, Robinson & Fernald (41)	○[4]	....	....	....	....	○[5]	....	....	○[20]	○[5]	....

TABLE I (Continued)

AUTHOR	*Rhus*	*Pseudosumac*	*Styphonia*	*Pseudoschmaltzia*	*Rhoeidium*	*Lobadium*	*Actinocheita*	*Malosma*	*Toxicodendron*	*Cotinus*	*Metopium*
1908 Britton & Shafer (14)	○	....	X[19]	....	....	....	....	....	X	X	X
1909 Coulter & Nelson (24)	○	....	....	....	....	○	....	....	○	....	....
1910 Abrams (1)	○	....	X[19]	....	....	X[9]	....	X[8]	X	....	....
1911 Daniels (27)	○	....	....	....	....	X[9]	....	....	X	....	....
1913 Small (105)	○	....	....	....	....	....	....	....	X	....	X
1913 Farwell (34)	○	....	....	....	....	○	....	....	○	....	....
1913 Britton & Brown (16)	○	....	....	....	....	X[9]	....	....	X	X	....
1914 Piper & Beattie (81)	○	....	....	....	....	....	....	....	○	....	....
1915 Wooton & Standley (128)	○	....	....	○	X	X[9]	....	....	X	....	....
1917 Rydberg (92)	○	....	....	....	....	○	....	....	X	....	....
1925 Jepson (51)	....	....	○	....	....	○	....	○	○	....	....
1925 McNair (69)	○	....	....	....	....	....	....	....	○	....	....
1925 Tidestrom (116)	○	....	....	....	....	○	....	....	X	....	....
1927 Rehder (87)	○	....	....	....	....	○[5]	....	....	○[5]	X	....
1932 Rydberg (94)	○	....	....	....	....	○	....	....	X	....	....
1933 Small (106)	○	....	....	....	....	X[9]	....	....	X	X	X
1935 Munz (74)	○	....	○	....	....	○	....	○	○	....	....
1936 Lemée (62)	○	....	○	....	○	○	....	○	○	X	X
1936 Jepson (52)	....	....	○	....	....	○	....	○	○	....	....
1937 Barkley—	○[17]	○[5]	○[5]	○[5]	○[5]	○[5]	X	X	X	X	X

[1] As *Toxicodendron*.
[2] As *Rhus-Toxicodendron*.
[3] As *Lobadium* and *Turpinia*.
[4] Section SUMAC.
[5] As section.
[6] As subgenus RHUS.
[7] As subgenus.
[8] As *Lithraea*.
[9] As *Schmaltzia*.
[10] In section TRICHOCARPAE.
[11] Section SUMAC of subgenus TRICHOCARPAE.
[12] Section LOBADIUM of subgenus TRICHOCARPAE.
[13] Subsection SUMAC of section TRICHOCARPAE.
[14] Section RHUS.
[15] With the generic designation *Schmaltzia*.
[16] With the generic designation *Rhus*.
[17] Subgenus SUMAC.
[18] Subgenus SCHMALTZIA.
[19] With the generic designation *Neostyphonia*.
[20] Section VENENATAE.

* The parenthetical numbers refer to the articles listed in the assembled bibliography at the end of part I.

L. and its immediate American relatives; *Cotinus* for *Cotinus Coggygria* Scop.; and *Toxicodendron* for *Toxicodendron radicans* (L.) Kuntze and *Toxicodendron Vernix* (L.) Kuntze. However, in the 'Species Plantarum' of 1753, Linnaeus (63) established the genus *Rhus* by the inclusion of eleven species[1] which are now considered Anacardiaceous, submerging therein all three of the Tournefortian genera.[1] Almost immediately, Miller (72), in his eighth edition of the 'Gardener's Dictionary,' segregated *Toxicodendron.* Since that time *Rhus* has been reviewed in part and in its known entirety many times, some of the more notable treatments being shown in table I. These varied from the mere nomenclatorial catalogues of Steudel (113), Patterson (79), and Kuntze (59), to the careful descriptions and re-evaluations in the monographic studies of the group by Engler (32), Gray (40), and Greene (42-45).

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[1] *Rhus Cobbe* L. is disregarded as being non-Anacardiaceous [*Allophyllus Cobbe* (L.) Blume of the Sapindaceae].

One of the earliest comprehensive studies of *Rhus* is that of de Candolle (18) in his 'Prodromus,' in which he treats *Rhus* with *Mauria* HBK., *Duvaua* Kunth, and *Schinus* L., in Tribe SUMACHINEAE of the 'Terebinthaceae.' He considers the species of *Rhus* as constituting five sections: (a) COTINUS; (b) METOPIUM; (c) SUMAC, equivalent to the genera *Rhus* and *Toxicodendron* of Tournefort, as well as most of the African species; (d) THEZERA, composed of two species, *Rhus pentaphylla* Desf. and *R. ziziphina* Tineo; and (e) LOBADIUM.

The most careful treatment of *Rhus* in its entirety is the excellent monograph by Engler (32) in de Candolle's 'Monographiae Phanerogamarum.' In this work *Cotinus* and *Metopium* are segregated as genera and all of the other species of *Rhus, sensu Linnaei,* are distributed into four sections: (a) TRICHOCARPAE built around *Rhus Coriaria* L. and equivalent to the genus *Rhus* as treated in the present monograph (except that *Rhus trichocarpa* Miq. would here be considered as belonging in the Toxicodendron-complex and that *Rhus potentillaefolia* Turcz. is here treated as constituting the monotypic genus, *Actinocheita);* (b) VENENATAE, which included the Toxicodendron-complex and *Malosma;* (c) GERONTOGEAE, which contained most of the African and Indian species from Sections SUMAC DC. and THEZERA DC.; and (d) MELANOCARPAE, which included the two black-fruited species, *Rhus retusa* Zoll. and *R. simarubaefolia* Gray.

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[1] *Rhus* is one of the six genera of the Anacardiaceae given in Linnaeus' 'Species Plantarum' (63) which Engler includes in his delimitation of the family; the other genera being *Anacardium, Spondias, Pistacia, Schinus,* and *Mangifera.* Engler gives fifty-eight genera in his treatment of the Anacardiaceae in Engler and Prantl's 'Naturlichen Pflanzenfamilien.'

In 1891 Kuntze (59) revived the Tournefortian name *Toxicodendron* and made new combinations by renaming most of the species of *Rhus, sensu Engleri.* In 1903 Small (104) designated the term *Schmaltzia* for the genus *Rhus* in a restricted sense, reserving the name *Rhus* for the plants usually called (when segregated) *Toxicodendron.*

In 1897, Gray (40) treated *Rhus* of the United States in the most inclusive sense in which it has ever been considered. In addition to *Cotinus, Metopium,* and *Rhus,* in the sense of Engler, he included the American representative of *Pistacia* as *Rhus mexicana* (HBK.) Gray. Gray's work was keenly executed, and it is interesting to note that seemingly he was the only early botanist to understand the similarities between such species as *Rhus virens* Lindh., *R. integrifolia* (Nutt.) Benth. & Hook., *R. microphylla* Engelm., and *R. aromatica* Ait., for he alone included them all in LOBADIUM, as contrasted with the "true sumacs," of his section RHUS.

The most important single work concerning the Central American species is Hemsley's 'Biologia Centrali-Americana' (48), while that for the West Indies is Grisebach's 'Catalogus Plantarum Cubensium . . .' (46).

The later American workers have not been in accord in their interpretation either of generic limits or of species in this complex. Small (104–106), Britton (12–16), Abrams (1), and Greene (42–45) seem inclined to segregate *Styphonia, Toxicodendron,* and *Schmaltzia, sensu strictissimo.* Coulter (23), among others (see table I), includes *Toxicodendron* and *Schmaltzia* in *Rhus,* while Jepson (51, 52) and Munz (74) would in addition include *Styphonia* and *Malosma.* In the interpretation of species such conservative workers as Robinson and Fernald, following the treatment by Gray (41), consider the group as composed of very few large species. Britton (12–16), Small (104–105), Rydberg (91–94), and others have treated the group as composed of comparatively few, but somewhat smaller species; while some students of the group, the foremost of which was Greene (42–45), have delimited a great number of small local species.

The work of Engler (32) and of Gray (40) may be taken as models of the most excellent conservative treatment of the group in the area under consideration. However, no recent attempt has been made to clarify the identity or validity of the many new combinations which have since occurred, and it is hoped that the present revision will help to evaluate them in the light of modern usage.

MORPHOLOGY

In common with many of the Anacardiaceae, the species under consideration have cyclic, heterochlamydic, and mostly 5-parted flowers, with a superior, tricarpellary compound pistil, usually with a single fertile carpel, containing (in these species) a single basally attached and anatropous ovule. All have a disk between the pistil and stamens. The stamens are as many as the petals and alternate with them. The calyx in fruit is not enlarged, and the petals are more or less truncate.

An insight into the general morphological relationship between the genera under consideration and the related genera in the Anacardiaceae may be gained by reference to the key to the tribes of the Anacardiaceae and to the genera of the tribe RHOIDEAE from Engler's treatment of the family in Engler and Prantl's 'Die Natürlichen Pflanzenfamilien' (33). Some of the comparative morphological characters of the Rhus-complex are indicated in table II and in the following synoptic key[1] to the genera studied:

O Style on the side of the fruit; leaves simple..........................COTINUS
O Style placed more or less at the apex of the fruit; leaves simple or compound.
  Δ Layers of the fruit coat not finally separate; drupe longer than broad, not depressed; endocarp thin; leaves pinnately compound...........METOPIUM
  Δ Layers of the fruit coat separating in various ways; the drupe almost globular, oval, or depressed, and often somewhat flattened; endocarp thick and bony.

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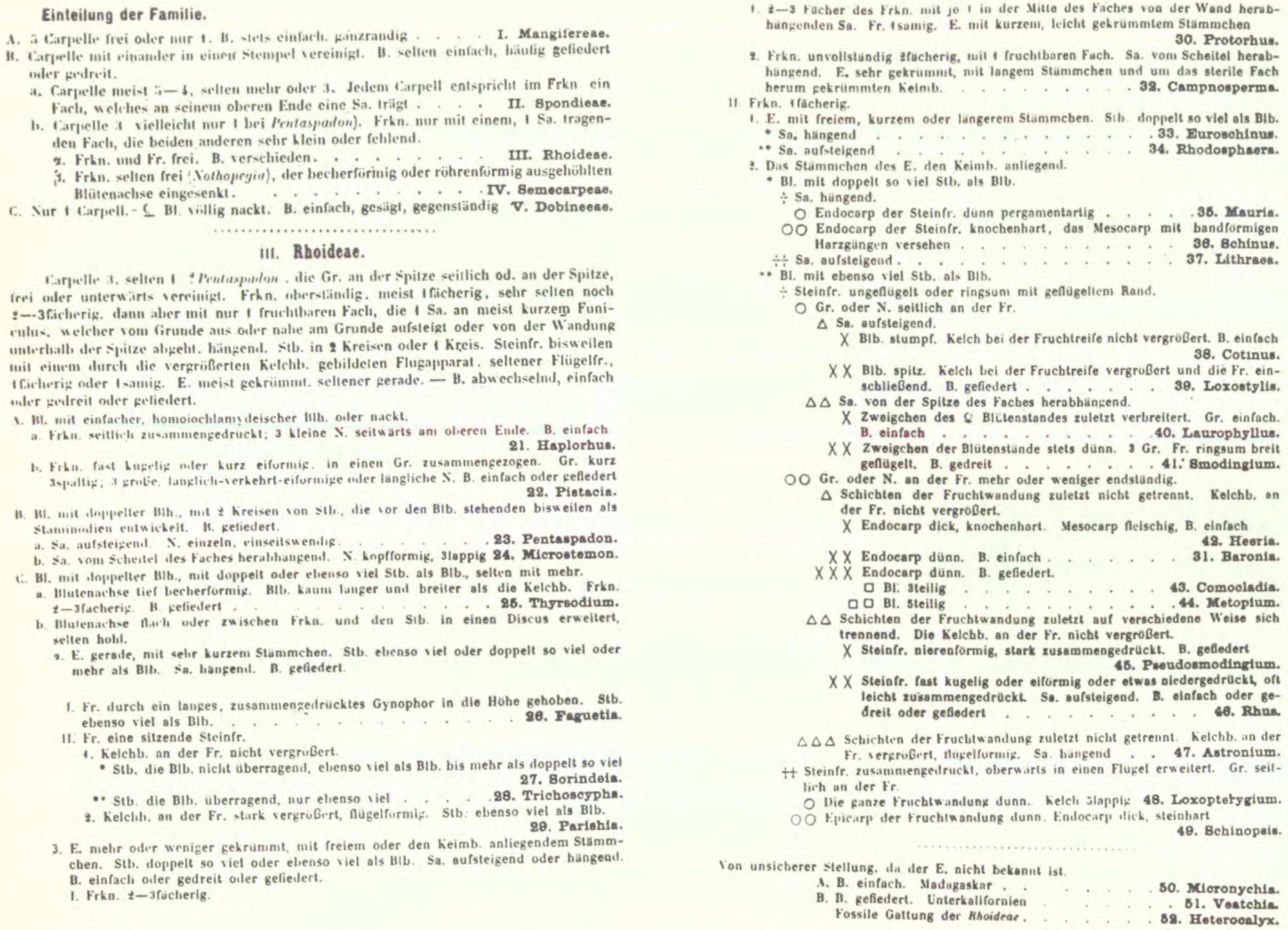
[1] For the sake of convenience, the sections MELANOCARPAE and GERONTOGEAE of Engler are included in brackets and italicized, although they are not further considered in this study.

- ☐ Ovary upon a gynophore; epicarp clothed with filiform silky hairs over 3 mm. long..ACTINOCHEITA
- ☐ Ovary not upon a gynophore; epicarp when clothed with hairs, with hairs less than 1.5 mm. long.
  - ′ Drupes red, pubescent with glandular hairs........................RHUS
  - ′ Drupes white or black, glabrous or sparingly pubescent with non-glandular hairs.
    - √ *[Drupes black, glabrous; exocarp and mesocarp adhering..MELANOCARPAE*
    - √ *Drupes white or dun-colored, glabrous or sparingly pubescent; mesocarp and endocarp adhering.*
      - o *Mesocarp not waxy, but resinous; leaves usually ternate..GERONTOGEAE*]
      - o Mesocarp waxy; leaves usually simple or pinnately compound.
        - ″ Drupes less than 2 mm. in diameter; mesocarp without fibers; effluvium innocuous; leaves coriaceous, simple; inflorescence a terminal thyrsus; evergreen shrubs or small trees....MALOSMA
        - ″ Drupes over 2.5 mm. in diameter; mesocarp with "fibers"; effluvium poisonous; leaves thin, compound; inflorescences lateral panicles; deciduous shrubs, small trees or vines..TOXICODENDRON

Underground Parts.—The root system in most of this complex is quite shallow. There is a widespread tendency to a vegetative reproduction by offshoots and rhizomes so that the plants characteristically appear in clumps or clones. However, individual specimens are common, and in some species apparently normally occur singly.

Habit and Habitat.—There is a great difference in habit and habitat in the various species. Some are exceedingly widespread and adaptive; others are quite restricted in habitat. The members of the component genera of the entire group are typically shrubs and small trees, although some of the tropical species of the subgenus SCHMALTZIA are subscandent, while in *Toxicodendron* they are often lianas—some species of this genus in fact may be subshrubs, shrubs, or lianas. The genus *Rhus* is typically a few-branched shrub, although some species are small trees; in the subgenus SCHMALTZIA the plants are often many-branched shrubs.

Stems.—The stems vary considerably. In the subgenus SCHMALTZIA (pl. 15) and in the genera *Toxicodendron, Cotinus, Metopium,* and *Malosma* the branches are comparatively slen-



Einteilung der Familie.

A. 5 Carpelle frei oder nur 1. B. stets einfach, ganzrandig . . . . . **I. Mangifereae.**

B. Carpelle mit einander in einem Stempel vereinigt. B. selten einfach, häufig gefiedert oder gedreit.

a. Carpelle meist 5—4, selten mehr oder 3. Jedem Carpell entspricht im Frkn ein Fach, welches an seinem oberen Ende eine Sa. trägt . . . . . **II. Spondieae.**

b. Carpelle 3 (vielleicht nur 1 bei *Pentaspadon*). Frkn. nur mit einem, 1 Sa. tragenden Fach, die beiden anderen sehr klein oder fehlend.

α. Frkn. und Fr. frei. B. verschieden. . . . . **III. Rhoideae.**

β. Frkn. selten frei (*Nothopegia*), der becherförmig oder röhrenförmig ausgehöhlten Blütenachse eingesenkt. . . . . **IV. Semecarpeae.**

C. Nur 1 Carpell. - ♀ Bl. völlig nackt. B. einfach, gesägt, gegenständig **V. Dobineeae.**

……

III. Rhoideae.

Carpelle 3, selten 1 (? *Pentaspadon*), die Gr. an der Spitze seitlich od. an der Spitze, frei oder unterwärts vereinigt. Frkn. oberständig, meist 1fächerig, sehr selten noch 2—3fächerig, dann aber mit nur 1 fruchtbaren Fach, die 1 Sa. an meist kurzem Funiculus, welcher vom Grunde aus oder nahe am Grunde aufsteigt oder von der Wandung unterhalb der Spitze abgeht, hängend. Stb. in 2 Kreisen oder 1 Kreis. Steinfr. bisweilen mit einem durch die vergrößerten Kelchb. gebildeten Flugapparat, seltener Flügelfr., 1fächerig oder 1samig. E. meist gekrümmt, seltener gerade. — B. abwechselnd, einfach oder gedreit oder gefiedert.

A. Bl. mit einfacher, homoiochlamydeischer Blh. oder nackt.

a. Frkn. seitlich zusammengedrückt; 3 kleine N. seitwärts am oberen Ende. B. einfach **21. Haplorhus.**

b. Frkn. fast kugelig oder kurz eiförmig, in einen Gr. zusammengezogen. Gr. kurz 3spaltig; 3 große, länglich-verkehrt-eiförmige oder längliche N. B. einfach oder gefiedert **22. Pistacia.**

B. Bl. mit doppelter Blh., mit 2 Kreisen von Stb., die vor den Blb. stehenden bisweilen als Staminodien entwickelt. B. gefiedert.

a. Sa. aufsteigend. N. einzeln, einseitswendig. . . . . **23. Pentaspadon.**

b. Sa. vom Scheitel des Faches herabhängend. N. kopfförmig, 3lappig **24. Microstemon.**

C. Bl. mit doppelter Blh., mit doppelt oder ebenso viel Stb. als Blb., selten mit mehr.

a. Blütenachse tief becherförmig. Blb. kaum länger und breiter als die Kelchb. Frkn. 2—3fächerig. B. gefiedert . . . . **25. Thyrsodium.**

b. Blütenachse flach oder zwischen Frkn. und den Stb. in einen Discus erweitert, selten hohl.

α. E. gerade, mit sehr kurzem Stämmchen. Stb. ebenso viel oder doppelt so viel oder mehr als Blb. Sa. hängend. B. gefiedert.

I. Fr. durch ein langes, zusammengedrücktes Gynophor in die Höhe gehoben. Stb. ebenso viel als Blb. . . . . **26. Faguetia.**

II. Fr. eine sitzende Steinfr.

1. Kelchb. an der Fr. nicht vergrößert.

* Stb. die Blb. nicht überragend, ebenso viel als Blb. bis mehr als doppelt so viel **27. Sorindeia.**

** Stb. die Blb. überragend, nur ebenso viel . . . . . **28. Trichoscypha.**

2. Kelchb. an der Fr. stark vergrößert, flügelförmig. Stb. ebenso viel als Blb. **29. Parishia.**

β. E. mehr oder weniger gekrümmt, mit freiem oder den Keimb. anliegendem Stämmchen. Stb. doppelt so viel oder ebenso viel als Blb. Sa. aufsteigend oder hängend. B. einfach oder gedreit oder gefiedert.

I. Frkn. 2—3fächerig.

1. 2—3 Fächer des Frkn. mit je 1 in der Mitte des Faches von der Wand herabhängenden Sa. Fr. 1samig. E. mit kurzem, leicht gekrümmtem Stämmchen **30. Protorhus.**

2. Frkn. unvollständig 2fächerig, mit 1 fruchtbaren Fach. Sa. vom Scheitel herabhängend. E. sehr gekrümmt, mit langem Stämmchen und um das sterile Fach herum gekrümmten Keimb. . . . . **32. Campnosperma.**

II. Frkn. 1fächerig.

1. E. mit freiem, kurzem oder längerem Stämmchen. Stb. doppelt so viel als Blb.

* Sa. hängend . . . . **33. Euroschinus.**

** Sa. aufsteigend . . . . **34. Rhodosphaera.**

2. Das Stämmchen des E. den Keimb. anliegend.

* Bl. mit doppelt so viel Stb. als Blb.

† Sa. hängend.

○ Endocarp der Steinfr. dünn pergamentartig . . . . . **35. Mauria.**

○○ Endocarp der Steinfr. knochenhart, das Mesocarp mit bandförmigen Harzgängen versehen . . . . **36. Schinus.**

†† Sa. aufsteigend . . . . **37. Lithraea.**

** Bl. mit ebenso viel Stb. als Blb.

† Steinfr. ungeflügelt oder ringsum mit geflügeltem Rand.

○ Gr. oder N. seitlich an der Fr.

△ Sa. aufsteigend.

× Blb. stumpf. Kelch bei der Fruchtreife nicht vergrößert. B. einfach **38. Cotinus.**

×× Blb. spitz. Kelch bei der Fruchtreife vergrößert und die Fr. einschließend. B. gefiedert . . . . **39. Loxostylis.**

△△ Sa. von der Spitze des Faches herabhängend.

× Zweigchen des ♀ Blütenstandes zuletzt verbreitert. Gr. einfach. B. einfach . . . . **40. Laurophyllus.**

×× Zweigchen der Blütenstände stets dünn. 3 Gr. Fr. ringsum breit geflügelt. B. gedreit . . . . **41. Smodingium.**

○○ Gr. oder N. an der Fr. mehr oder weniger endständig.

△ Schichten der Fruchtwandung zuletzt nicht getrennt. Kelchb. an der Fr. nicht vergrößert.

× Endocarp dick, knochenhart. Mesocarp fleischig, B. einfach **42. Heeria.**

×× Endocarp dünn. B. einfach . . . . **31. Baronia.**

××× Endocarp dünn. B. gefiedert.

□ Bl. 3teilig . . . . **43. Comocladia.**

□□ Bl. 5teilig . . . . **44. Metopium.**

△△ Schichten der Fruchtwandung zuletzt auf verschiedene Weise sich trennend. Die Kelchb. an der Fr. nicht vergrößert.

× Steinfr. nierenförmig, stark zusammengedrückt. B. gefiedert **45. Pseudosmodingium.**

×× Steinfr. fast kugelig oder eiförmig oder etwas niedergedrückt, oft leicht zusammengedrückt. Sa. aufsteigend. B. einfach oder gedreit oder gefiedert . . . . **46. Rhus.**

△△△ Schichten der Fruchtwandung zuletzt nicht getrennt. Kelchb. an der Fr. vergrößert, flügelförmig. Sa. hängend . . . **47. Astronium.**

†† Steinfr. zusammengedrückt, oberwärts in einen Flügel erweitert. Gr. seitlich an der Fr.

○ Die ganze Fruchtwandung dünn. Kelch 5lappig **48. Loxopterygium.**

○○ Epicarp der Fruchtwandung dünn. Endocarp dick, steinhart **49. Schinopsis.**

……

Von unsicherer Stellung, da der E. nicht bekannt ist.

A. B. einfach. Madagaskar . . . . **50. Micronychia.**

B. B. gefiedert. Unterkalifornien . . . . **51. Veatchia.**

Fossile Gattung der *Rhoideae* . . . . **52. Heterocalyx.**

Fig. 1. Engler's key to the tribes of the Anacardiaceae and to the genera of the tribe RHOIDEAE. From Engler and Prantl's 'Natürlichen Pflanzenfamilien' 3^5: 144, 154–157, in part. 1896.

TABLE II.

A CHART TABULATING SOME OF THE MORPHOLOGICAL CHARACTERS OF THE VARIOUS ELEMENTS OF THE RHUS-COMPLEX. A DOT INDICATES THE OCCURRENCE OF THE CHARACTER, WHILE A CIRCLE INDICATES THAT IT IS MERELY SOMEWHAT CHARACTERISTIC OF THE GROUP.

					Habit			Leaves			Texture		Inflorescence			Pedicels			Bracts	
			Deciduous	Evergreen	shrubs	trees	vines	simple	ternate	imparipinnate	thin	coriaceous	compound spike	thyrsus	lateral panicle	long	short	absent	deltoid, persistent	lanceolate, deciduous
COTINUS			●			●		●			●			●		●				●
ACTINOCHEITA				●		●				●		●			●		●			●
METOPIUM				●		●				●		●			●		●		●	
RHUS	SUMAC		●			●				●	●			●			●			●
	SCHMALTZIA	PSEUDOSUMAC		●	●					●	●		●					●	●	
		STYPHONIA		●		●		○				●	○					●	●	
		PSEUDOSCHMALTZIA		●	●					●		●	●					●	●	
		RHOEIDIUM	●		●					●	●		●					●	●	
		LOBADIUM	●		●				●		●		●					●	●	
MALOSMA				●		●		●				●		●			●			●
TOXICODENDRON	EUTOXICODENDRON		●				○		●		●				●		●			●
	VERNIX		●			●				●	●				●		●			●

			Styles		Styles			Ovary		Drupe		Fruit-coat				Mesocarp		Putamen		Fruit-color			Effluvium	
			lateral	terminal	united	partially united	free	stalked	sessile	symmetrical	gibbous	glabrous	glandularly hairy	short pilose	long pilose	waxy	not waxy	chartaceous	bony	red-orange	yellow-white	green	poisonous	innocuous
COTINUS			●				●		●		●	●					●		●			●		●
ACTINOCHEITA				●		●		●		●					●		●		○	●			●	
METOPIUM				●	●				●	●		●					●	●		●			●	
RHUS	SUMAC			●		●			●	●			●				●		●	●				●
	SCHMALTZIA	PSEUDOSUMAC		●		●			●	●			○	○			●		●	●				●
		STYPHONIA		●		●			●	○			○	○			●		●	●				●
		PSEUDOSCHMALTZIA		●		●			●	●			○	○			●		●	●				●
		RHOEIDIUM		●		●			●	●			○	○			●		●	●				●
		LOBADIUM		●		●			●	●			○	○			●		●	●				●
MALOSMA				●			●		●	●		●				●			●		●			●
TOXICODENDRON	EUTOXICODENDRON			●		●			●	●		○				●			●		●		●	
	VERNIX			●		●			●	●		○				●			●		●		●	

der, ranging from extreme slenderness to stoutness, while in *Actinocheita* and the subgenus Sumac (pl. 13, fig. b) they are typically thick and staghorn-like. The species under consideration are unarmed, except *Rhus microphylla* Engelm. which is subspinose. The surface of the young stems varies from quite glabrous, sparsely pubescent, canescent, to densely pilose. The stems are often pruinose.

Effluvium.—Schizo-lysigenous canals are present in the phloem of the root and stem and extend to the leaves and flowers. The effluvium in these canals is a thin milky substance which soon hardens and blackens on contact with the air. In *Metopium* and *Toxicodendron* it contains an irritant poison, affecting most people to a greater or lesser degree, while in *Rhus, Malosma* and *Cotinus* it is apparently innocuous. *Actinocheita* has once been reported as poisonous.

Leaves.—The leaves are always alternate. They vary from simple, through trifoliolate, to imparipinnately many-foliolate. Often there is much diversity in the leaf outline of one species. In texture the laminae are extremely thin to coriaceous. The upper surface may be dull or lustrous. The laminae are usually entire but are often serrate or dentate-serrate or crenulate, even differing widely on the same plant. The margins may be quite non-revolute, revolute, or even conspicuously inrolled beneath and may or may not be white-corneous. The upper surface ranges from a varnish-like luster to very dull, and varies to a small degree in the same species; the under surface is usually dull and lighter in color than the upper surface. The rachis segments may be wingless to broadly winged. In many species the veins are conspicuously whitened above, or above and below. In some species even the very small veins are quite distinct (pl. 13, fig. g). The leaflets are usually sessile or subsessile, although in some species they are petiolulate.

Pubescence.—The pubescence of leaves, stems, and fruits consists of multicellular unbranched hairs alone, or of these intermixed with club-shaped multicellular hairs. The pubescence on the leaf (pl. 13, fig. a) when present varies greatly, from appressed hairs to a soft pilosity; it is typically cinereous in color but in some species and varieties tends to be conspicuously ferruginous.

Inflorescence.—The flowers in all species are borne in clusters which are typically paniculate (pl. 15). In the genera *Metopium* and *Actinocheita* the panicles are erect and lateral; in *Toxicodendron,* lateral and mostly pendulous; in the genera *Cotinus* and *Malosma,* and in the subgenus Sumac, they form a terminal thyrsus which is very compact in *Malosma* and the subgenus Sumac. However, in the subgenus Schmaltzia the inflorescence is a compound spike which is usually rather stout and lateral even if clustered near the apex of the branches, but in the section Pseudosumac the panicles are very slender and are both apical and lateral near the apex of the branches. The pedicels typically equal or exceed the flowers in length, the conspicuous exception being Schmaltzia, where the flowers, except in two or three species, are quite sessile.

Bracts.—The bracts are usually considerably longer than broad, either blunt or acute at the apex, and deciduous; a conspicuous exception being in Schmaltzia, where they are ovate, short deltoid-ovate, or even appearing as a vaginate pouch. Typically, a single bract subtends each flower; however, a bract and two bracteoles subtend each flower in the subgenus Schmaltzia. In *Metopium* and in Schmaltzia the bracts are more or less persistent.

Flowers.—The entire group tends to have relatively small, polygamo-dioecious, pentamerous flowers (pls. 10–12).

Calyx.—The calyx, except in abnormal flowers, is five-parted, usually composed of five sepals which join below the disk. However, in *Metopium* the calyx is five-lobed. The calyx-lobes vary from broadly lanceolate to rotund-ovate. Typically, the calyx is persistent.

Corolla.—The corolla, except for abnormal flowers, is composed of five petals which vary in shape from lanceolate to obovate-rotund. In most species the petals are deciduous.

Disk.—The disk varies within wide limits in the complex. In some cases it is very broad, thin, cup-shaped, and is much or little lobed. Often it becomes much thicker and narrower, a tendency which is culminated in *Actinocheita* where it is so narrowed and thickened that it is no longer cup-shaped but appears as a columnar gynobase.

Stamens.—The stamens are borne under the edge of the disk, alternating with the petals and lobes of the disk. The comparative length of the filament varies greatly in the different species. In some it is considerably enlarged below. The anthers fall into three general groups: oval, oblong, or "lanceolate." The size of the stamens varies greatly in the same species according to the degree of sexuality.

Stigmas and Styles.—In *Metopium* the stigma and style are undivided. In the other members of the complex the stigmas are usually separate, while the styles are united in varying degrees, or are entirely distinct as in *Malosma* and *Cotinus.* The styles are attached to the apex of the ovary, except in *Cotinus,* where they are laterally inserted.

Ovary and Fruit.—The ovary shows extreme variation within the complex, but is relatively constant within the species. It is tricarpellary, but with a single fertile carpel. The fruit is a more or less dry drupe, approximately as broad as long in all members of the group except *Metopium* (pl. 14, fig. c), and may be more or less flattened. In *Cotinus* the epicarp is glabrous, dull, and conspicuously veined; in *Metopium* and *Malosma* it is glabrous and shining, more or less light-colored, and in *Malosma* with a dark line running down one side from the apex to base; in *Toxicodendron* it is from straw- to cinereous-colored and typically glabrous, although in some species a sparse microscopic close-lying pubescence may be present, and in others a papillate-scabrous pubescence; in *Actinocheita* it has very long, silky pilosity; in *Rhus,* as here delimited, it has a red glandular pubescence: in SUMAC, this is intermingled with deeply red-stained, club-shaped or filiform hairs, and in SCHMALTZIA intermingled with multicellular unbranched hyaline hairs.

Ovule and Seed.—The single anatropous ovule in the one fertile cell of the ovary produces the seed. The seed vary in size quite considerably, being two millimeters or less in *Malosma* and over ten millimeters in *Rhus Lentii* Kellogg. In some species they are rather plump, in others quite flat; sometimes the outline is quite irregular, sometimes very regular; in some species they are quite smooth while in others they are heavily ridged. In *Metopium* the seed-coat is thin and chartaceous, while in the other genera it is hard and bony, although only moderately so in *Actinocheita.*

SPECIFIC DELIMITATION

The universally accepted ideal of modern taxonomy is to show practicable units of classification as well as phylogeny. The degree of differentiation within generic groups, their intergradation, minor fluctuations, and hybridizations in varying degrees mean that taxonomists have been unable to set a uniform standard; so that delimitations are somewhat arbitrary and artificial. Each monographer must rely on his own interpretation of specific and generic concepts. The results, while not achieving uniformity nor necessarily a happy phylogeny, are often agreeably usable, which is a consideration of prime practical importance.

John Ray was one of the first to give a definite meaning to the term species. He considered a group of organisms which are more like each other than those belonging to other groups and capable of interbreeding with each other, a species; and further that variations within a species as being more or less continuous. At present the word species signifies a grade in classification assigned to groups of individuals considered to be more closely interrelated by common descent than to forms judged to be outside of that species. The known individuals of the species differ less markedly amongst themselves than they do from individuals considered as not of the species, and the differing individuals of a species are linked by intermediate forms. At present the most usable criteria for the delimitation of species are morphology and geographic distribution.

While cytology and genetics would doubtless furnish additional pertinent data, their requirement of living material is at present prohibitively cumbersome for most monographic studies. Morphological data of course are subjectively selected, and geographic distribution is to be interpreted as known geographic range.

The degree of variation in the different species is extremely wide. Probably the most stable of the species studied are *Rhus virens* Lindh., *R. choriophylla* Woot. & Standl., *R. Andrieuxii* Engl., *R. typhina* Torn., *R. Copallina* L., *R. Michauxii* Sarg., *R. Barclayi* (Hemsl.) Standl., and *Toxicodendron Vernix* (L.) Kuntze.

The author has had to be content to interpret large groups of varying individuals as polymorphic or inclusive species unless a series of concomitant variations were found. The outstanding example of such a polymorphic species is *Rhus glabra* L., where many extreme variations are to be found, but which are apparently quite independent of one another and occur throughout much of the range of the species. *Toxicodendron radicans* (L.) Kuntze, *Rhus microphylla* Engelm., and *R. aromatica* Ait. are other large, polymorphic species. The variation in such species probably may be best considered as an early stage of speciation.

The variations of *Rhus trilobata* Nutt., which are more or less concomitant and tend to be found in localized areas, probably may be best considered as a later stage of speciation. Likewise many species in section PSEUDOSUMAC may be interpreted as comparatively recently evolved.

In variations among many species, such as *Rhus terebinthifolia* Schlecht. & Cham. and *R. costaricensis* Riley, *R. integrifolia* (Nutt.) Benth. & Hook. and *R. ovata* Wats., *R. Lentii* Kellogg and *R. integrifolia* (Nutt.) Benth. & Hook, especially when closely related, with overlapping ranges and with variation toward the neighboring related species, an infiltration of the characters of the related species through hybridization suggests itself.

The taxonomic difficulties are apparently often increased in polymorphic species by hybridization; some of the variations of *Rhus trilobata* Nutt. and *R. aromatica* Ait., *R. glabra* L. and *R. typhina* Torn., *Toxicodendron radicans* (L.) Kuntze and *T. quercifolia* (Michx.) Greene, found in areas of common distribution, are conceivably due in part to this cause.

GENERIC RELATIONSHIP

The selection of genera for this study is an arbitrary one, based on a group of species forming an historical unit (the Linnaean concept of *Rhus*). It contains elements somewhat separated phylogenetically which form a few genera in a much larger complex (the tribe RHOIDEAE). Most of the genera have many morphological characters in common, reappearing in different combinations throughout the group, so that more than the broadest generalizations as to their phylogeny would necessarily be mostly speculation. However, the species concerned certainly fall into three natural groupings which are not too intimately related: *Cotinus, Metopium,* and those species that Engler included in *Rhus.*

In *Cotinus* the characters of the inflorescence—long fertile and plumose sterile pedicels, lateral styles, and very thin, permanently united fruit coats—all indicate wide phylogenetic divergence from the other genera. Its long geologic history as a little variable type would also seem to lend support to this view.

The morphology of *Metopium* is not so divergent from that of *Rhus,* although the general coarseness of the plant, the permanently adhering fruit coats, the papery endocarp, and the more or less united calyx-lobes indicate considerable phylogenetic segregation, a deviation certainly as distant from *Rhus* as are *Mosquitoxylum* and *Pseudosmodingium.*

The members of the narrower Rhus-complex can apparently be regarded as forming a phylogenetically related group of genera. Considering their morphology they fall into two general categories, *Rhus* and *Actinocheita* forming one, and *Malosma, Toxicodendron,* and the groups of species designated by Engler as Sections GERONTOGEAE and MELANOCARPAE, the other.

While *Actinocheita* has a general vegetative morphology suggestive of the subgenus Sumac, the dense mat of very long, silky, non-glandular, unbranched hairs on the fruit and especially the highly modified disk in the form of a gynophore would indicate a major phylogenetic segregation.

Another group of genera has several physiological characteristics which are distinctly suggestive in the way of phylogeny. First, the species grouped by Engler in the sections Gerontogeae and Melanocarpae (with which this work is not concerned) have little, if any, wax in the fruit coat, while the mesocarp of *Malosma* and *Toxicodendron* has a considerable amount. Second, while the sap of *Malosma* is quite innocuous, that of *Toxicodendron,* in common with several other Anacardiaceous genera, contains a powerful irritant poison.

The subgenus Sumac is an assemblage of about a dozen species generally distributed over much of North America, Asia, and around the Mediterranean. Perhaps their most distinguishing characters are the deciduous, lanceolate bracts subtending the flowers and the red pubescence of the fruit which in most of the species consists of club-shaped, glandular hairs intermingled with variously shaped, red-stained hairs. The entire subgenus is surprisingly uniform in many of its characters, notably the staghorn-like branches, the thin, imparipinnately compound leaves, and the predominance of serrate-margined leaflets.

On the other hand, the subgenus Schmaltzia as here delimited is an assemblage of about thirty species with rather similar floral morphology but rather diverse vegetative morphology. The group is typified by the bracts, which are usually broader than long, by the spicate ultimate branches of the inflorescence, and by the sessile flowers, which are subtended by a bract and two bracteoles. There is much minor variation in the leaves and inflorescence. In section Lobadium the flowers are intermediate in size and occur in rather compact, rigid, compound spikes, and the leaves are thin to subcoriaceous, and trifoliolate. In the monotypic section Rhoeidium, the flower characters are essentially the same, but the very small leaves are pinnately many-foliolate and the rachis is winged. In sections STYPHONIA and PSEUDOSCHMALTZIA the inflorescence is a compact or expanded, but rigid, branched, axillary or terminal, compound spike, with very large flowers (for *Rhus!).* The leaves of section STYPHONIA are typically simple but are rarely trifoliolate; those of PSEUDOSCHMALTZIA are typically trifoliolate to pinnately many-foliolate with naked or winged rachis. In section PSEUDOSUMAC the very small flowers are disposed in delicate, much-branched, very diffuse, terminal and axillary, compound spikes.

A morphological sequence from some species of section PSEUDOSCHMALTZIA, such as *Rhus virens* Lindh., to most of the other species can be traced. From this center a connection can be shown with *Rhus terebinthifolia* Schlecht. & Cham. through *Rhus Hartmanii* Barkl.; likewise with *Rhus integrifolia* (Nutt.) Benth. & Hook. through *R. choriophylla* Woot. & Standl. or *R. chondroloma* Standl. The relationship to *Rhus microphylla* Engelm. and *R. trilobata* Nutt. is not so easy to follow, but in the latter species there is a possibility that it is through such forms as *Rhus Galeottii* Standl. or *R. Arsenei* Barkl.

The branching of the inflorescence and the tri-bracteate, sessile flowers of SCHMALTZIA closely approximate the condition found in the related genus *Mosquitoxylon.* There is a rather wide gap in many morphological details between the subgenera SUMAC and SCHMALTZIA. The nearest approach to an intermediate species in inflorescence characters is *Rhus Lentii* Kellogg, which has a loose terminal panicle and ovate, deciduous bracts. If the interpretation of such fossil specimens known as *Rhus coriarioides* and *R. vexans* Lesquereux (Tertiary of Florissant, Colorado) is correct, it would seem that these subgenera had diverged very early.

There is little paleobotanical evidence to show the phylogeny of the members of the complex, for most of the known fossil genera and subgenera—*Toxicodendron, Cotinus, Metopium,* SUMAC, SCHMALTZIA and ''GERONTOGEAE''—seem to be traceable at least to the Miocene where they often appear as forms remarkably similar to present species (10, 20, 31, 55).

The keys to species and varieties, while partly artificial, indicate in a general way a phylogenetic synopsis of each genus.

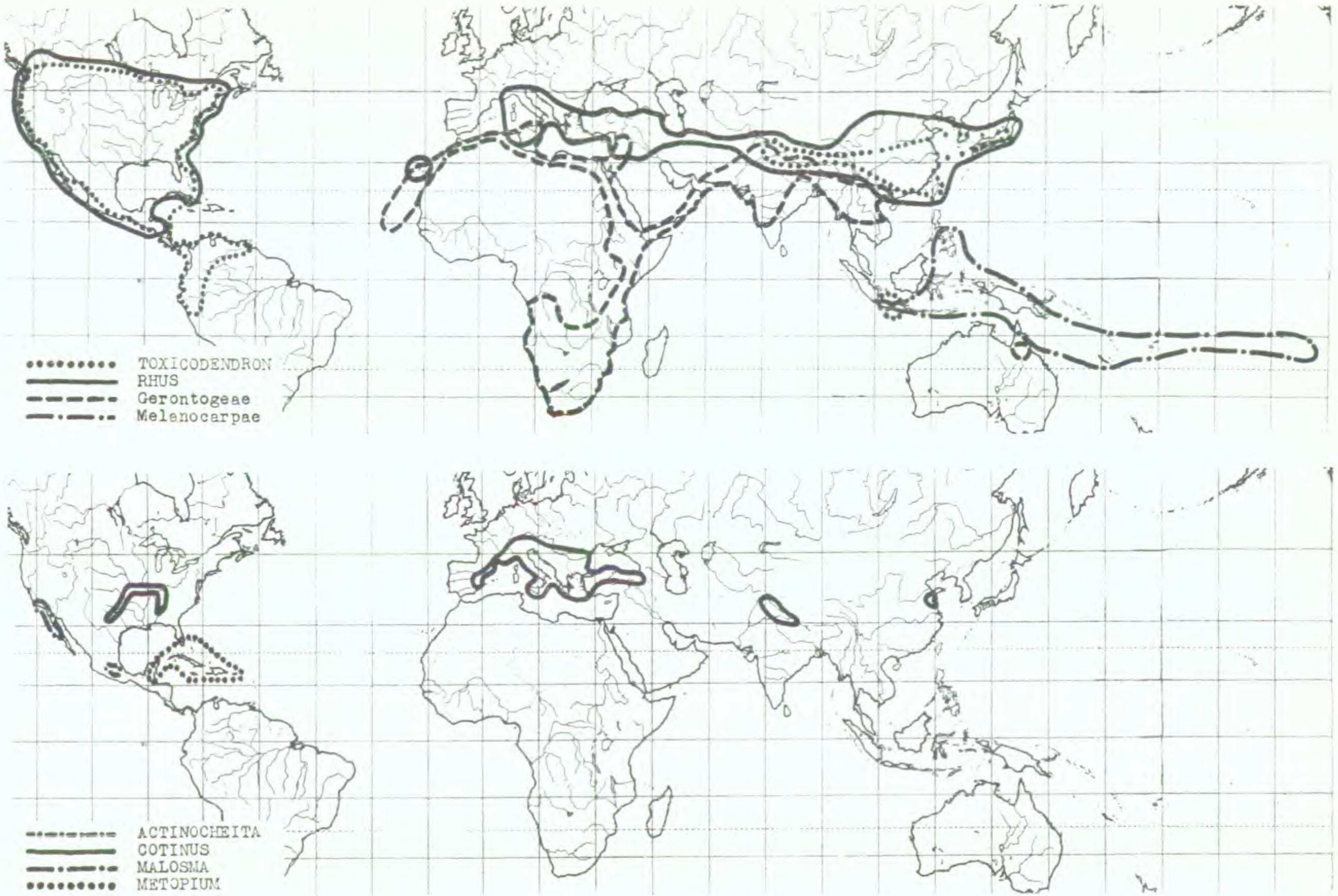
GEOGRAPHIC DISTRIBUTION

The Anacardiaceae attains its highest development in the tropics and subtropics of both hemispheres, but in the existing flora it is especially well represented in the Malaysian region. The Rhus-complex, however, is the exception for the family, for it is mostly extra-tropical, with centers of distribution in both the northern and southern hemispheres.

Rhus is the most widespread genus of the complex, and SUMAC is the more widespread of the subgenera, forming a continuous band in the North Temperate Zone (figs. 2–3). Two generally dispersed species and several of more restricted range occur in North America, their distribution being centered in southeastern United States. In Eurasia SUMAC is represented by several species whose ranges center around southeastern China, with the single species, *Rhus Coriaria* L., extending into Asia Minor, along the European Mediterranean shores, and to the Canary Islands. The distribution of SCHMALTZIA is centered in Mexico; that of sections PSEUDOSUMAC and PSEUDOSCHMALTZIA in Mexico: RHOEIDIUM in southwestern Texas, LOBADIUM in Texas, and STYPHONIA in southern California.

At present *Cotinus* is found in isolated areas in the North Temperate Zone in both the Old and New World (fig. 3). It is a very old genus (10, 31), and the present intermittent distribution probably represents mere remnants of a former widespread range.

Toxicodendron is distributed over North America from Canada southward to South America from Venezuela to Peru. In Asia it is found from Japan, through China, to the Himalayas of northern India, and in Java. Section EUTOXICODENDRON occurs throughout the United States, southward well into Mexico, and in Japan and China. Section VERNIX is represented in the New World by *Toxicodendron Vernix* (L.) Kuntze in eastern United States, and by *T. striata* (Ruiz & Pav.) Kuntze which occurs from southern Mexico into northwestern South


TOXICODENDRON
RHUS
Gerontogeae
Melenocarpae
ACTINOCHEITA
COTINUS
MALOSMA
METOPIUM

Figs. 2 and 3. The geographic distribution of the Rhus-complex: fig. 2 (upper), the distribution of *Rhus*, *Toxicodendron*, GERONTOGEAE, and MELANOCARPAE; fig. 3 (lower), of *Cotinus*, *Malosma*, *Metopium*, and *Actinocheita*.

America. In the Old World there are several species in eastern Asia and one in Java.

Metopium is a small genus with restricted range. For the most part it is West Indian, but occurs on the mainland in Florida and in Yucatan.

Malosma is a monotypic genus restricted in range to southern California and Lower California.

Actinocheita is another monotypic genus endemic to a limited area in Mexico, in the region of the states of Guerrero, Puebla, and Oaxaca.

ECONOMIC USES[1]

The family Anacardiaceae contains numerous plants of economic importance; however, the employment of many is at present more a matter of historical than of practical interest.

Many of the genera are the source of tannins, dyes, woods, medicines, fruits, and other products of varying degrees of importance. Plants of the genera considered in this monograph have appeared from prehistoric times in the ethnobotany of three diverse culture centers: *Toxicodendron* in China and later in Japan, *Rhus* and *Cotinus* in the Occident, and *Rhus* in the Amerindian cultures of the Americas. Probably the most important use is in the production of the finest grades of Chinese and Japanese lacquer. Lacquer is an irritant poison. Workers in the industry seem to become immune, but those not so immunized may be painfully poisoned by handling the lacquered articles.[2] The production of a high grade of varnish is not limited to the Asiatic members of *Toxicodendron*, for the sap of many of the poisonous genera of the Anacardiaceae, particularly *Toxicodendron,* has the property of becoming black and drying into a durable varnish.

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[1] See also Sweet and Barkley (114).

[2] This poison is the same as found in most species of the genus to a lesser, or mostly to a greater, extent. Prophylactic and therapeutic treatments number in the hundreds. Washing the skin just before or after exposure with a 5 to 10 per cent ferric chloride solution in either 50 per cent alcohol or in 25 per cent glycerine, or washing repeatedly just after exposure with a soap containing an excess of alkali, usually lessens the skin irritation. After the appearance of the skin eruption many local remedies, such as hot potassium permanganate baths and lead or aluminum acetate lotions, have been found useful. More recently extracts containing the toxic agent in hydro-alcoholic saline or almond oil solution are being successfully employed to produce rapid and, in many cases, relatively permanent immunity. See also McNair (68), Barkley and Howard (6), and Barkley (3).

Some of the members of the genus *Toxicodendron* have been widely used for medicine in America. Toxicodendron, poison oak, or sumac veneneux—the leaves of *Toxicodendron radicans* (L.) Kuntze—was formerly official in the United States, and a tincture is used by homeopathic practitioners. The Meskwaki and Potawatomi medicine men used it for poulticing some kinds of swellings. An infusion of the young branches and leaves of *Toxicodendron Vernix* (L.) Kuntze is employed in homeopathic practice.

To the Indians of the southwestern United States, the squaw bush, lemita, or lemonade sumac, *Rhus trilobata* Nutt. has long been of utmost importance. The sour berries were eaten ripe, or with salt when green, and were often collected and dried for later use. The Indians also made a refreshing drink by soaking the fruit with sugar in water. Dr. Edward Palmer (76) states that the "young twigs of this plant are used in the manufacture of baskets. The wood exhales a peculiar odor, which is always recognizable about Indian camps, and never leaves articles made from it. It grows loosely in mountain ravines, and attains a height of five to eight feet." In Utah, Arizona, southern California, and New Mexico, the Indians depend solely upon this plant for material to make their baskets. It is far more durable and tougher than the willow, which is not used by these Indians. Their baskets will hold water, and are often used as cooking vessels, hot stones being dropped in from time to time until the food is done. Wooton and Standley (128) say that the Indians also used the roots of this plant for their basketry and for setting dyes. Mexicans sometimes mix the stems with willow branches in making baskets. The wood of this species was much employed by the Indians for bows, and the leaves are reported as a smoking ingredient of the Comanches.

Havard (47) says that the bruised fruits of several species of sumac—*Rhus glabra* L., *R. typhina* Torn., *R. Copallina* L., *R. integrifolia* (Nutt.) Benth. & Hook., and *R. ovata* Wats.—

were added to water to make it more cooling, refreshing, and palatable. The very acid berries of *Rhus integrifolia,* which are covered with a white oily efflloresence, were gathered by Indians to prepare a refreshing drink, either being used fresh or dried or roasted. The fruit of *Rhus ovata* Wats., described as being very acid but coated with a thin, sweet, waxy encrustment, was formerly collected by the natives, the combination making an excellent cooling drink. Standley (111) says that the flowers of *Rhus ovata* yield a good quality of honey and that the flower clusters were boiled and eaten by the Coahuila Indians of California, while a decoction of the leaves was employed as a remedy for coughs and for pains of the chest. The hard heavy wood of the California mahogany, *Rhus integrifolia* (Nutt.) Benth. & Hook., is valued as fuel.

According to Standley (111), Reko reports that the Zapotics of Oaxaca employ *Rhus terebinthifolia* Schlecht. & Cham. in steam baths as a remedy for rheumatism and syphilis, and as a preparation for parturition.

Both *Rhus typhina* Torn. and *Rhus glabra* L. have been of particular importance in the economics of the American Indian. According to Smith (109), the root of *Rhus typhina* Torn. was used by the Pillager Ojibwe as a medicine to stop hemorrhages. In speaking of the use of this plant (107), he says:

> "This tree is a very valuable one to the Indians, yielding three distinct kinds of medicines. The root bark, divested of the outer skin and inner wood, yields a tea which is a remedy for 'inward' troubles. . . . The inner bark of the trunk is considered a valuable pile remedy and is spoken of as being 'puckering' or astringent. The 'top,' or twigs, of the smaller shrubs is hairy, and because of this is used in the treatment of various female diseases. The acid-flavored berries are used in combination with other herbs like the Greater St. John's Wort for consumption and pulmonary troubles."

The berries of *Rhus typhina* were mixed with the root of *Euphorbia corollata* and the bark of *Quercus macrocarpa* and used by the Meskwaki Indians as a remedy for pinworms. Smith (107, 109) reports that the Menomini and Ojibwe boil the roots to procure a yellow dye, the leaves and bark (especially that of the roots) being rich in tannin. According to

Sargent (97), the young shoots are used in the preparation of pipes for drawing the sap of the sugar maple.

In the Rhus-complex, *Rhus glabra* L. is the outstanding example of the wide use "primitive" man could make of a plant which at first glance would seem entirely useless. The fruit, besides making a cooling drink in the summer, was cooked in water with maple sugar by the Ojibwe to form a hot drink during the winter. Parker (77) states that the Iroquois Indians eat raw newly grown sumach sprouts as a salad and alterative. Smith (109) says:

> ". . . all parts of the smooth sumac are suitable for medicine, the root bark, trunk bark, twig bark, leaves, flowers and fruit. The root bark tea is used as a hemostatic. Trunk and twig innerbark are used in combination with other medicine for their astringent qualities. Blossoms are sometimes steeped for sore eyes, leaves are used for poultices and the fruit is considered a throat cleanser as well as being the basis of a beverage."

An infusion of *Rhus glabra* was formerly official in the Pharmacopoeia of the United States. The Pawnee Indians employed a decoction of the fruit for dysmenorrhoea and dysentery. An infusion of the inner bark of the root has been recommended for mercurial ptyalism; it was used by the Pawnee Indians for urinary troubles. West (124) reports that the Omahaws mixed the leaves with tobacco for smoking. In order to obtain an orange color, many Indians boiled their rush, woven bark mats, and other materials in a mixture of the central pith of the stems of *Rhus glabra* and bloodroot.

In addition to their other uses, some of the sumacs are much grown as ornamental shrubs. *Rhus javanica* L., *R. glabra* L., *R. typhina* Torn., and *R. Copallina* L., the more popularly grown species, are used mostly for their large pinnate foliage which turns a brilliant orange or red early in the fall. Also, their large staghorn-like branches and clusters of deep red fruits which persist through the winter make them rather attractive the year around. The laciniate varieties of *Rhus glabra* and *Rhus typhina* are much planted because of their very ornamental fern-like foliage. *Cotinus americanus* Nutt. is grown for its brilliant autumnal coloring.

An economic value, frequently overlooked,[1] is afforded by the species of *Toxicodendron* and *Rhus* as a ground cover to protect land from erosion. They are also of prime importance as pioneer species in the revegetation of denuded areas; their importance in this position in the prairie region of North America is indicated by the term Rhus-Symphoricarpus Community which is often applied to a pioneer phase of the deciduous woodland. The species of the subgenus SUMAC are of especial interest in wild-life management not only in the provision of cover for game, but in supplying food during the critical seasons of late winter and early spring.

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[1] From correspondence with Ben O. Osborn and others.

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II. TAXONOMY

ABBREVIATIONS

The herbaria from which material has been studied and from which specimens are cited in this monograph are indicated by the following abbreviations:

A = Herbarium of the New York State Museum.
B = Brooklyn Botanic Garden Herbarium.
Cath = Catholic University of America Herbarium.

CA = California Academy of Sciences Herbarium.
Calif = University of California Herbarium, Berkeley.
Deam = Personal Herbarium of Chas. C. Deam.
Farwell = Personal Herbarium of O. A. Farwell.
F = Field Museum of Natural History Herbarium.
G = Gray Herbarium of Harvard University.
K = Herbarium of the Royal Botanic Gardens, Kew.
M = Missouri Botanical Garden Herbarium.
Madrid = Madrid Botanical Garden Herbarium.
Minn = University of Minnesota Herbarium.
ND = University of Notre Dame Herbarium (including the Greene Herbarium).
NY = New York Botanical Garden Herbarium.
Okla = University of Oklahoma Herbarium.
P = Pomona College Herbarium.
PA = Herbarium of the Academy of Natural Sciences of Philadelphia.
Penn = University of Pennsylvania Herbarium.
RMt = Rocky Mountain Herbarium at the University of Wyoming.
US = United States National Herbarium.

KEY TO GENERA

Leaves simple; pedicels of sterile flowers at length becoming plumose; style lateral; drupe becoming very gibbous............................*Cotinus*
Leaves usually compound; pedicels of the sterile flower never becoming plumose; style terminal; drupe almost symmetrical.
  Stigma short and undivided; putamen smooth and chartaceous......*Metopium*
  Stigmas distinct or partly united; putamen crustaceous or bony.
    Ovary upon a column formed by the disk; epicarp clothed with filiform silky hairs over 3 mm. long..............................*Actinocheita*
    Ovary not upon a column; epicarp, when clothed with hairs, with hairs less than 1.5 mm. long.
      Drupes red, noticeably pubescent with red glandular hairs............*Rhus*
      Drupes whitish or dun-colored, glabrous or sparingly pubescent, pubescence on fruit never glandular.
        Drupes very small; mesocarp without fibers; plant apparently innocuous; leaves coriaceous, simple; inflorescence a terminal thyrsus; evergreen shrubs..............................*Malosma*
        Drupes larger; mesocarp with ''fibers''; effluvium poisonous; leaves thin, compound; inflorescence in lateral panicles; deciduous shrubs, small trees or vines.........................*Toxicodendron*

COTINUS [Tourn.] Miller, non Gomez de la Maza.

Cotinus Tourn., Inst. Rei Herb., p. 610. 1700; Miller, Gard. Dict., abrdg. ed. 4. 1754; Moench, Meth., p. 73. 1794; Nutt., N. Am. Sylva **3**: 1. 1849; Engler in DC., Monogr. Phaner. **4**: 349. 1883; Dippel, Handb. Laubholzk. **2**: 382. 1892; Engler in Engl. & Prantl, Nat. Pflanzenfam. **3**^{5}: 164. 1892; Sargent, Sylva **3**: 3. 1892; Koehne, Deutsche Dendrol. p. 359. 1893; Britton, Manual, p. 601. 1901; Small, Fl. Southeast. U. S., p. 726. 1903; Britton, N. Am. Trees, p. 613. 1908; Britt. & Brown, Illustr. Fl., ed. 2. **2**: 484. 1913; Sargent, Manual, ed. 2. p. 657. 1922; Bailey, Man. Cult. Pl., p. 459. 1924; Schaffn., Manual Ohio, p. 348. 1928; Small, Man. Southeast. Fl., p. 808. 1933; Stem. & Myers, Okla. Fl., p. 298. 1937.

Rhus L., Sp. Pl. **1**: 267. 1753, in part; Miller, Gard. Dict., ed. 8. 1768, in part; Willd., Sp. Pl. **1**: 1477. 1798, in part; DC., Cat. Pl. Hort. Bot. Monsp., p. 55. 1813, in part; DC., Prodr. **2**: 67. 1825, sect. COTINUS; Endl., Gen. Pl., p. 1131. 1840, sect. COTINUS; Ench. Bot., p. 599. 1841, sect. COTINUS; Walp., Rep. Bot. Syst. **1**: 551. 1842, in part; Gray, Gen. Pl. U. S. **2**: 157. 1846, in part; Gray, Syn. Fl. N. Am., p. 381. 1897, sect. COTINUS.

Deciduous shrubs or small trees with yellow wood, scaly bark, and strong-smelling juice. Leaves alternate, simple, slender-petioled, entire or slightly toothed, dull green, glabrous or more or less pilose-pubescent. Flowers polygamous, yellowish-white, mostly abortive, in loose, terminal panicles, with the pedicels of the numerous abortive flowers elongating and becoming plumose-villous. Bracts of the inflorescence lanceolate, deciduous. Sepals 5, imbricate, persistent. Petals 5, oblong, twice as long as the lance-ovate sepals, somewhat spreading. Stamens 5, shorter than the petals, inserted under the annular disk; filaments short; anthers shorter than the filaments. Ovary oblique, sessile, 1-celled, with 3 short lateral styles. Fruit a small, dry, green, veiny, reniform, gibbous drupe, with the fruit coats dry and permanently united.

Europe, Asia, and North America.

Type species: **Cotinus Coggygria** Scop., Fl. Carn. **1**: 220. 1772 (*Rhus Cotinus* L., Sp. Pl. **1**: 267. 1753).

Geologically speaking *Cotinus* is very old, having been well represented in the Miocene. Ethnologically it is old, having a written history antedating the Christian era. It seems to be a conservative genus in which minor morphological variations occur to a much lesser degree than in most genera of the group. It is represented in the New World by a single species of interrupted distribution in the Mississippi Valley.

1. **Cotinus americanus** Nutt., N. Am. Sylva **3**: 1. 1849; Sarg., Gard. & For. **4**: 340. 1891. Pl. 16, fig. 2.

Cotinus cotinoides Britt., Mem. Torr. Bot. Club **5**: 216. 1894.

Rhus Cotinus Torr. & Gray, Fl. N. Am. **1**: 216. 1838, non L., Sp. Pl. **1**: 267. 1753; Nutt., Trav. Ark., p. 177. 1821, without description.

Rhus cotinoides Nutt. ex Torr. & Gray, Fl. N. Am. **1**: 217. 1838, in syn.; Cooper, Rept. Smiths. Inst. for 1858, p. 250. 1859; Chapm., Fl. South. U. S., p. 70. 1860.

Rhus americana Sudw., Bull. Torr. Bot. Club **19**: 80. 1892.

Small trees 2–10 m. tall; twigs at first glaucous, later becoming brown; leaves scattered, alternate, thin, obovate or elliptical, 5–17 cm. long, 3.5–9 cm. wide, obtuse or somewhat acutish at apex, rarely emarginate, usually cuneate at the base, the lowest short-petioled, upper long-petioled, at first puberulent, at maturity dark green and smooth above, paler and sparsely pubescent beneath, particularly along the midrib and larger veins, turning brilliant orange and scarlet in the fall; petioles 0.5–6 cm. long; inflorescence appearing late in April or early in May in short terminal panicles about 10 cm. long; flowers many, polygamo-dioecious, mostly abortive, the pedicels of the abortive flowers becoming long and plumose-villous; bracts of the inflorescence lanceolate, more or less persistent; sepals 5, lanceolate, acute, 1 mm. long, 0.3 mm. broad, glabrous; petals 5, oblanceolate, rounded, 2 mm. long, 1 mm. broad, glabrous; fruit produced sparingly, 4 mm. long, reniform, fruiting panicles about 30 cm. long.

This species is very similar to the European *Cotinus Coggygria* Scop., but has larger, thinner, obovate leaves, more cuneate leaf-bases, and a less showy fruiting panicle. The American plant lacks the conspicuously whitened leaf margin common in the European species, and also tends to be somewhat larger and more tree-like.

Distribution: Tennessee and Alabama, Missouri to Oklahoma, and Texas (fig. 4).

ALABAMA[1]: Monte Sano near Huntsville, April 3, May 28, *Herb. Geol. Surv. Ala.* (ND); near Huntsville, Oct. 7, 1898, *Canby (Sargent & Muir) 22* (F, M); dense forests on shelves of calcareous rocks near Huntsville, *Mohr* (M); calcareous rocks, mountainous woods, near Huntsville, May 2, 1882, *Mohr* (F, M); mountainous woods near Huntsville, May 24, 1882, *Mohr* (M); near Huntsville, May, 1892, *Mohr 23* (ND); Huntsville, July 1891, *Shimek* (F, M); along limestone rocks on slope of plateau southeast of Woodland Mills, May 19, 1934, *Harper 3230* (M, ND); Tuscaloosa, May 22, 1926, *Wheeler 358* (F).

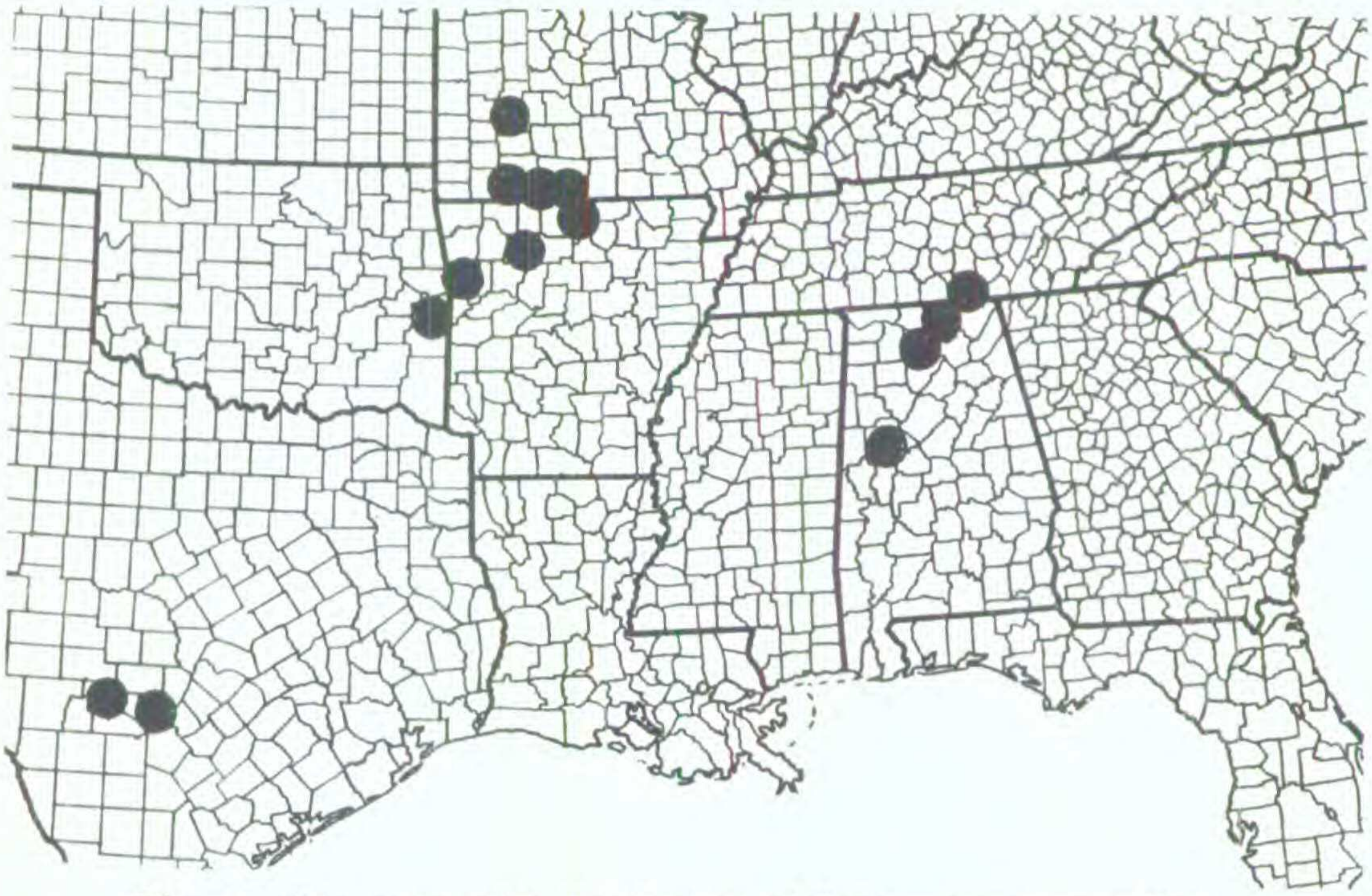

Fig. 4. The geographic distribution of *Cotinus americanus* Nutt.

TENNESSEE: Cumberland Mt. at Cowan, May 8, 1898, *Eggert* (M).

MISSOURI: glades, Pontiac, Sept. 20, 1929, *Kellogg 15221* (M); Tecumseh, Oct. 7, 1927, *Palmer 32914* (M); rocky slopes, bald knobs, "Bald Jesse," Gainesville, June 26, 1928, *Palmer 34732* (M); along rocky river bluffs, Pontiac, June 27, 1928, *Palmer 34793* (M); top of limestone bluffs along Pomme de Terre River, ½ mile north of Burns, July 17, 1934, *Steyermark 13595* (M); high bluffs of White River,

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[1] In the citation of specimens, the geographic arrangement is north to south and east to west: Canada, United States, Mexico, Central America, West Indies, and South America. In the various states the collections are grouped by counties; however, the county names are omitted here to conserve space.

June 4, 1914, *Palmer 5856* (F, M); rocky banks and bluffs, Roark, Sept. 28, 1920, *Palmer 19219* (M); wooded lower slopes of ''Bald Joe,'' April 30, 1924, *Palmer 24612* (M); common on bluffs, Swan, June 6, 1898, *Bush 64* (F, M, ND); common on bluffs, Swan, June 2, 1899, *Bush 21* (M, ND); common on rocky bluffs, Forsyth, June 10, 1899, *Bush 50* (M); bluffs of White River, Branson, Oct. 23, 1913, *Palmer 4710, 4723*, rocky bluffs, Branson, Sept. 29, 1920, *Palmer 19253* (M); rocky bluffs and ledges, hollows between bald knobs, Melva, Sept. 17, 1924, *Palmer 26187* (M); along high rocky bluffs of Long Creek, near Oasis, June 3, 1931, *Palmer 39482* (F, M); Taney Co., Sept. 1936, *Sayres* (M); Swan Creek bluffs, Forsyth, Aug. 7, 1897, *Trelease 257* (M); Swan, Aug. 6, 1897, *Trelease 258* (M); club house, White River, 12 miles from Forsyth, May 1906, *Wideman* (M).

ARKANSAS: Norfolk, May 21, 1927, *Demaree 3040* (M); rocky bluffs, Cotter, June 14, 1914, *Palmer 5971* (M); rocky bluffs of White River, Cotter, July 24, 1916, *Palmer 10556* (M); bluffs at Van Buren, April 5, 1929, *Demaree 6406* (F); rocky bluffs of Buffalo River, Jasper, May 8, 1925, *Palmer 27085* (M).

OKLAHOMA: [wooded calcareous banks on Grand River, a tributary of the Arkansas], ''Arkansas,'' *Nuttall* (PA type); along rocky ravines, west side of Rich Mountains, near Page, April 14, 1929, *Palmer 33313* (M).

TEXAS: rocky woods, Banders Pass, 1884, *Reverchon 1643* (M); Spanish Pass, July 5, 1911, *Clemens* (M); rocky hillsides, Spanish Pass, May 23, 1916, *Palmer 9865* (M); Kerrville, July 1909, *Mackensen 8* (F).

METOPIUM P. Browne

Metopium P. Browne, Hist. Jamaica, p. 177. 1756; Engler in DC., Monogr. Phaner. **4**: 367. 1883; Engler in Engl. & Prantl, Nat. Pflanzenfam. **3**^{5}: 167. 1892; Urban, Bot. Jahrb. **21**: 612. 1896; Small, Fl. Southeast. U. S., p. 726. 1903; Urban, Symb. Antil. **5**: 403. 1908; Small, Fl. Miami, p. 112. 1913; Sargent, Manual, ed. 2, p. 658. 1922; Standl., Contr. U. S. Nat. Herb. [Trees & Shrubs Mex.] **23**: 664. 1923; Small, Man. Southeast. Fl., p. 808. 1933.

Cotinus M. Gomez de la Maza, El Prog. Med. (Havana) **8**: 50. 1896, in part, non Mill., Gard. Dict., abrdg. ed. 4. 1754.

Rhus Willd., Sp. Pl. **1**: 1477. 1798, in part; DC., Prodr. 2: 67. 1825, sect. METOPIUM; G. Don, Gen. Hist. Dichl. Pl. **2**: 69. 1832, sect. METOPIUM; A. Rich. in Sagra, Hist. Cuba, Bot: 381. 1839; Endl., Gen. Pl., p. 1131. 1840, sect. METOPIUM; Ench. Bot., p. 599. 1841, sect. METOPIUM; Nutt., N. Am. Sylva **2**: 120. 1849, in part; Griseb., Cat. Pl. Cub., p. 67. 1866, in part; Sargent, Sylva **3**: 13. 1892, in part; Gray, Syn. Fl. N. Am. **1**: 382. 1897, sect. METOPIUM.

Deciduous trees with flaky bark. Leaves alternate, imparipinnate with 1–7 leaflets, more or less persistent. Leaflets coriaceous or subcoriaceous, glabrous, with more or less whitened and subrevolute margins, veins often whitened, prominent below or above and below; rachis almost terete. Flowers polygamo-dioecious or perfect, in loose ascending panicles in the axils of the deciduous leaves. Calyx 5-lobed, persistent, ciliate-margined. Petals 5, ascending, glabrous. Ovary 1-celled, sessile on the disk; style terminal; stigma slightly 3-lobed. Drupes usually elongated, epicarp glabrous, shining; mesocarp thick; fruit coats permanently united; seed chartaceous, diamond-shaped, flattened, smooth.

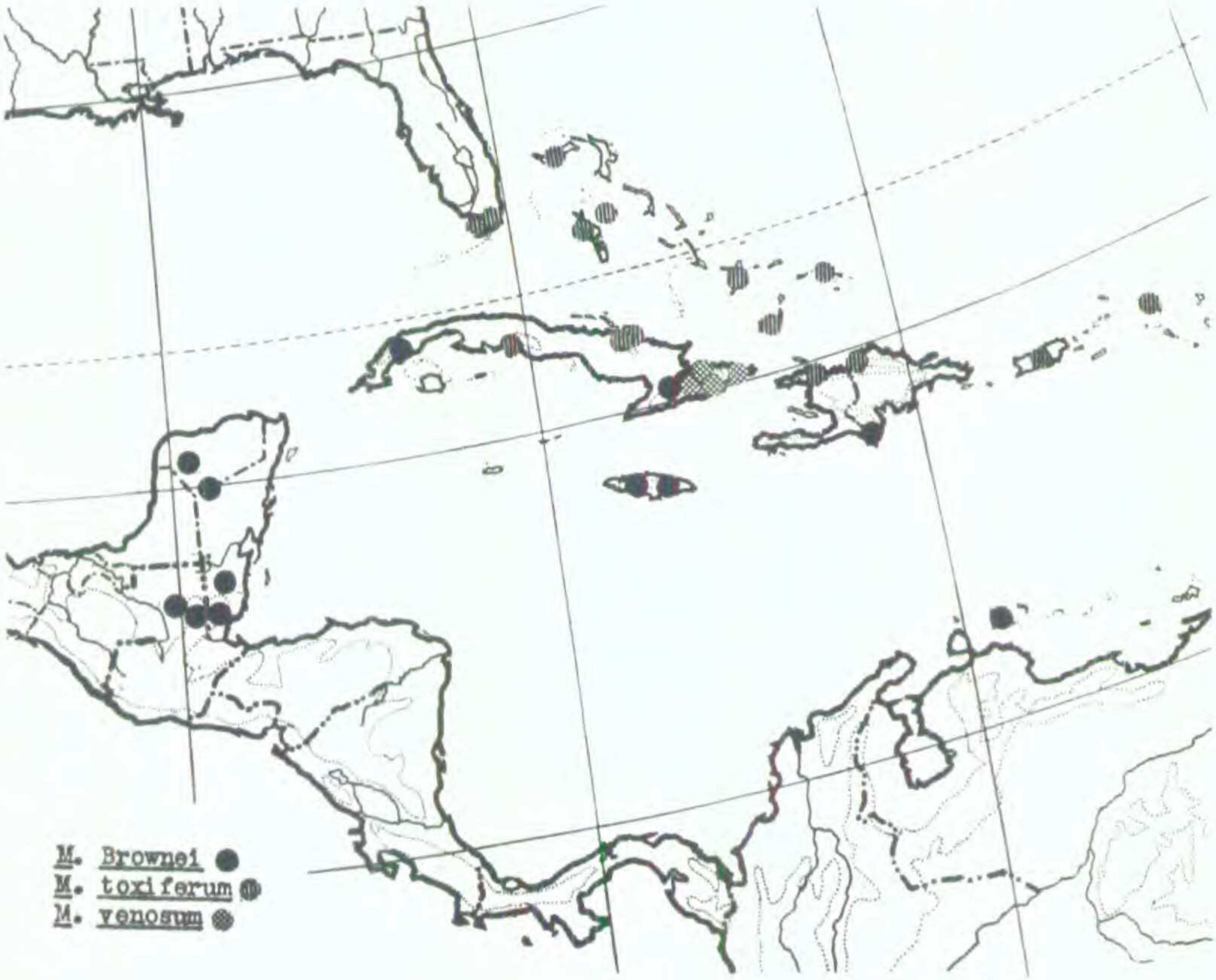

Fig. 5. The geographic distribution of the species of *Metopium*.

Florida, West Indies, and Central America. Berry describes a fossil species from the Wilcox (Lower Eocene) of Tennessee, Mississippi, and Texas.

Type species: **Metopium Brownei** (Jacq.) Urb., Symb.

Antil. **5**: 402. 1908 *(Terebinthus Brownei* Jacq., Enum. Syst. Pl. Carib., p. 18. 1760).

KEY TO THE SPECIES

Branches slender; leaflets lanceolate............................*1. M. venosum*

Branches coarse; leaflets deltoid to ovate.

- Leaflets deltoid to ovate-elliptical, distinctly revolute, mostly not undulate in desiccation; calyx-lobes imbricated in the bud; anthers shorter than filaments; Florida, the Bahamas, Porto Rico to Cuba.......*2. M. toxiferum*
- Leaflets ovate or oval, slightly revolute, usually undulate in desiccation; calyx-lobes not imbricated in the bud; anthers longer than filaments; Cuba to Central America.................................*3. M. Brownei*

1. **Metopium venosum** (Griseb.) Engler in DC., Monogr. Phaner. **4**: 367. 1883. Pl. 17, fig. 1.

Rhus venosa Griseb., Cat. Pl. Cub., p. 67. 1866.

A slender bush or small tree, 2–4 m. tall; branches slender; leaves 5–7-foliolate, 15–20 cm. long, rachis segments 1.5–3 cm. long; leaflets lanceolate, 3.5–7.5 cm. long, 0.75–2.5 cm. broad, smooth, shining above, subcoriaceous, veins reticulate, prominent above and below, margins slightly whitened, slightly revolute, not undulate in desiccation, apex acuminate, base cuneate and decurrent on the petiolule, lateral petiolules 0–9 mm. long; petioles slender; panicles axillary above the leaves, lax-flowered, glabrous, peduncles and pedicels slender; calyx-lobes half orbicular, some imbricate in the bud; stamens with slender filaments longer than the oval anthers.

A very distinct, but little-collected species of restricted range in eastern Cuba.

WEST INDIES:

CUBA: ORIENTE: Baracoa, 1914, *Ekman 3513* (NY); alt. 500 m., Alto de la Mesa de Prada, southern Baracoa region, July 17–Aug. 4, 1924, *Leon 11802* (NY); Cayo Grande, Canete, Baracoa, Sept. 4, 1907, *Roig 118* (NY); dry rocky hillside, Serpentine Formation, alt. 400–500 m., Sierra Nipe, along the trail Piedra Corda to Woodfred, Dec. 13, 1909, *Shafer 3158* (NY, US); alt. 100–200 ft., trail, Rio Yamaniguey to Camp Toa, Feb. 22–26, 1910, *Shafer 4192* (F, NY, US); dry serpentine thickets, Baracoa to Florida, March 15, 1910, *Shafer 4323* (F, NY, M photo., US); dry serpentine hill, Loma Santa Teresa, near El Yungue, Oriente, Dec. 2, 1910, *Shafer 7737* (NY, US); Moa Bay, east of Rio Moa, Jan. 2–3, 1911, *Shafer 8306* (NY, US); Loma del Pinal Mayavi, Cuchillas de Baracoa, May 14, coll. of 1860–1864, *Wright 2288* (G, NY, M, **cotypes**).

2. **Metopium toxiferum** (L.) Krug & Urb., Bot. Jahrb. **21**: 612. 1896.

Metopium Linnaei Engler in DC., Monogr. Phaner. **4**: 367. 1883, in part.

M. Linnaei var. *Oxymetopium* Engler in DC., *ibid.* **4**: 368. 1883.

M. Metopium Small, Fl. Southeast. U. S., p. 726. 1903.

Amyris toxifera L., Syst. Nat., ed. 10. **2**: 1000. 1759.

Persea alpigena Spreng. in L., Syst. Veg., ed. 16. **2**: 268. 1825, excl. syn.

Rhus metopium A. Rich. in Sagra, Hist. Cuba, Bot. 381. 1839; *ibid.* **10**: 157. 1845, excl. syn.

R. Oxymetopium Griseb., Cat. Pl. Cub., p. 67. 1866.

A low tree about 3–7 m. tall; branches medium-heavy; leaves 1–7-foliolate, 12–25 cm. long, 4–5 cm. between leaflets, rachis coarse; leaflets deltoid to ovate-elliptical or orbicular, oval or lanceolate-deltoid, 3.5–8 cm. long, 2.5–6 cm. broad, smooth, shining above, coriaceous to heavy-coriaceous, veins reticulate, prominent above and below, or prominent only below, margins distinctly whitened and strongly revolute, slightly or not at all undulate in desiccation, apex acuminate or abruptly acuminate, rarely obtuse, base retuse, truncate or obtuse, rarely slightly decurrent, and rarely unequal; lateral petiolules 2–22 mm. long, medium-heavy; flowers with calyx-lobes obscurely imbricated in the bud; calyx-lobes half orbicular; stamens with filaments longer than the oval anthers; fruit dull, about 10 mm. long, 6 mm. broad; petioles coarse; panicles somewhat diffuse, erect, with coarse peduncles and pedicels.

A comparatively widespread species of the northern part of the West Indian region. It varies within comparatively narrow limits, but the specimens from the Bahamas tend to have somewhat thicker leaflets, which are smooth and shining above, and the fruits are somewhat shorter than the average of the species.

Distribution: Florida, the Bahamas, Porto Rico to Cuba (fig. 5).

UNITED STATES:

FLORIDA: pine lands, near Camp Jackson, March 25, 1904, *Britton 241* (F); Miami, Nov. 1903, *Carter & Small 1234* (F); Brickell Hammock, Miami, April 30, 1930, *Duckett* (M); in tropical hammock, Brickell Hammock, Miami, May 9, 1933, *Duckett 230* (ND); Miami, May–July, 1877, *Garber* (F); Homestead, March 12, 1930, *Moldenke 778a* (M); Biscayne Bay, 1874, *Palmer 97* (F, M); 10 miles southwest of Royal Palm Hammock, Everglades, May 22, 1925, *Palmer 27505* (M); between Cutler and Longview Camp, Nov. 9–12, 1903, *Small & Carter* (F); Biscayne, Jan. 1, 1896, *Webber 269* (F); Elliott's Key, Jan. 4, 1896, *Webber 339* (M); Miami, 1904, *Westgate* (F); Planters, April 1903, *Hitchcock* (F); Bahia Honda Key, *Chapman 38* (F); coral soil in forests, Bahia Honda Key, May, *Curtiss 448* (F, M); thickets at base of old lighthouse, July 16, 1895, *Curtiss 5477* (M); Key Largo, April 27, 1896, *Curtiss 5638* (M); Key West, March 28–30, 1906, *Hitchcock* (F); near south beach, Key West, Feb. 28–March 9, 1904, *Lansing 2020* (F); No Name Key, May 1891, *Simpson 227* (F); Palm Beach Co., Dec. 26, 1895–Jan. 11, 1896, *Hitchcock 329, 330* (F).

WEST INDIES:

ANGUILLA ISLES: Salt Key Banks at the south end, May 15–16, 1909, *Wilson 8034* (F, M, NY).

BAHAMA ISLANDS: Port Horne, Nov. 20, 1890, *Hitchcock* (M); west of Spring Point, Acklin Island, Dec. 21, 1905–Jan. 6, 1906, *Brace 4500* (F, NY); Mangrove Cay, Andros Island, Aug. 18–Sept. 10, 1906, *Brace 4962* (F, US); Conch Sound, Andros Island, May 8, 1890, *Northrop 552* (F); coppice, Smith Hill, Long Bay Cays Section, Andros Island, Jan. 23–24, 1910, *Small & Carter 8672* (F, NY, US); Crooked Island, Nov. 1890, *Hitchcock* (M); low scrub lands, Jacksonville and vicinity, East Caicos, Feb. 26 and 27, 1911, *Millspaugh 9110* (F, NY); Fortune Island, Feb. 4, 1888, *Eggers* (US); Fortune Key, Nov. 1890, *Hitchcock* (M); Fortune Key, winter 1890–1891, *Rothrock 513* (F); Cheroki Sound, Great Abaco Island, Dec. 30, 1904, *Brace 1976* (NY); coastal coppice, Pinders Point, Great Bahama Island, Feb. 5–13, 1905, *Britton & Millspaugh 2514* (F, NY); Great Inagua, Dec. 4, 1890, *Hitchcock* (M); salt pond hill, Great Inagua, Oct. 12, 1904, *Nash & Taylor 969* (F, NY); Blakesville, Great Inagua, Oct. 18, 1904, *Nash & Taylor 1136* (F, NY); white lands, salt pond hill to salt ponds, Great Inagua, Oct. 26, 1904, *Nash & Taylor 1327* (F, NY); Matthew Farm to Homer Savannah, Great Inagua Island, Nov. 4, 1904, *Nash & Taylor 1424* (NY); west end, Little Inagua, Dec. 21, 1907, *Wilson 7774* (F, NY); Abraham Bay and vicinity, Mariquana, Dec. 6–8, 1907, *Wilson 7502* (F, NY); near Nassau, New Province Island, May 23, 1903, *Curtiss 33* (M, US); Nassau, New Providence Island, Nov. 1890, *Hitchcock* (M); pine barrens, Providence, April 7, 1904, *Millspaugh 2056* (F); soldier's road, near Blue Hill road (pine region), about 3 miles south of Nassau, New Providence Island, March 19, 1905, *Wight 220* (F, NY); vicinity of Groutstown, New Providence Island, May 28–29, 1909, *Wilson 8227* (F, NY); North Caicos, Kew and vicinity, Caicos Islands, Dec. 18, 1907, *Wilson 7747* (F, NY).

CUBA: 1860–1864, *Wright 2287* (M cotype of *Rhus Oxymetopium* Griseb.); *Wright 2289* in part (US); CAMAGUEY: savanna north of La Gloria, Feb. 9, 1909, *Shafer 287* (F, US); Cayo Guajaba, March 7, 1909, *Shafer 671* (F, US); Punta Guajaba, Cayo Guajaba, Oct. 8, 1909, *Shafer 2431* (F, US); western part of Cayo Cruz, Oct. 28, 1909, *Shafer 2807* (F, US); SANTA CLARA: Milpa, Cienfuegos Bay, April 20, 1930, *Jack 7925* (F).

DOMINICAN REPUBLIC: San Gabriel Island, west of San Lorenzo, April 5–10, 1921, *Abbott 1251* (US); rocky coast 3–4 miles west of San Lorenzo Bay, south coast of

Samaná Bay, sea-level, April 5–10, 1921, *Abbott 1271* (US); District Monción, near Los Junquitos, alt. 350 m., May 5, 1931, *Valeur 860* (M), July 22, 1931, *698* (F, M).

HAITI: Port de Paix, *Ekman 3644* (US); Port de Paix, Dec. 25, 1928, *Leonard 11193* (M, US); Port de Paix, Jan. 25, 1929, *Leonard 12338* (M, US); mountain trail, mountains south of Jean Rabel, Feb. 9, 1929, *Leonard 13085* (US); near Bombardopolis, alt. 610 m., Feb. 21, 1929, *Leonard 13374* (US); near Basse Terre, Tortue Island, March 22, 1929, *Leonard 13966* (US); arid coral rocks, near Basse Terre, Tortue Island, *Leonard 14074* (US); near Bassin Bleu, alt. 630–1500 m., April 14–19, 1929, *Leonard 14865* (US); near La Vallée, Tortue Island, May 4–10, 1929, *Leonard 15338* (US); dry coastal thickets east of Port de Paix, May 13, 1929, *Leonard 15650* (US).

PORTO RICO: Salinas de Cobo-Rojo, Feb. 17, 1885, *Sintenis 528* (US); Tenuelas in Monte Vi, July 8, 1886, *Sintenis 4800* (F, M, US).

3. **Metopium Brownei** (Jacq.) Urb., Symb. Antil. **5**: 402. 1908.

Metopium Linnaei Engler in DC., Monogr. Phaner. **4**: 367. 1883, in part.

M. Brownei var. *brachycarpum* Urb., Symb. Antil. **5**: 403. 1908.

Cotinus Metopium M. Gomez de la Maza, El Prog. Med. (Havana) **8**: 50. 1896.

Rhus Metopium L., Syst. Nat., ed. 10. **2**: 964. 1759; Fawcett & Rendle, Fl. Jamaica **5**: 9. 1926; Brisseau-Mirbel & Jolyclerc, Hist. Nat. Pl. **17**: 177. 1806, as *r. methopium.*

R. quinquefolia Stokes, Bot. Mat. Med. **2**: 161. 1812.

R. metopia St. Lag., Ann. Soc. Bot. Lyon **7**: 133. 1880.

Terebinthus Brownei Jacq., Enum. Syst. Pl. Carib., p. 18. 1760, as *T. Brovvnii.*

Tree 5–25 m. tall; branches medium in size; leaves 5–7-foliolate, 18–30 cm. long, 3–5 cm. between leaflets, rachis slender; leaflets ovate, oval, or very rarely slightly obovate, 5–11 cm. long, 2.5–6.5 cm. broad, somewhat shining above, thin, coriaceous, veins reticulate, prominent above and below, margins somewhat whitened, very slightly revolute, usually undulate in desiccation, apex abruptly acuminate or obtuse or very rarely slightly emarginate or obcordate, base truncate, obtuse, or cuneate, often unequal and decurrent on the petiolule; petiolules 5–16 mm. long, slender; calyx-lobes hemispherical, not imbricated in the bud; stamens with lanceolate anthers much exceeding the short filaments; fruit shining, about 1.5 cm. long, half as broad; petioles slender; panicles diffuse, lax, spreading, with slender peduncles and pedicels.

A comparatively widespread species whose range extends from Cuba to Jamaica and Central America. The specimens from Jamaica often have thinner and more orbicular leaflets than is typical for the species as a whole. Gaumer reports that this tree furnishes the most beautiful of all the varieties of rosewood—difficult to work and poisonous to the workmen. While this species and *Metopium toxiferum* are very similar in general aspect, they seem to be quite distinct.

Distribution: Haiti and Cuba to Jamaica, Curaçao, and in Central America (fig. 5).

MEXICO:

YUCATAN: Izamal, *Gaumer 601* (F, M); Laguna de Chichankanab, *Gaumer 1867* (F, M); between Sisal and Progreso, March, 1916, *Gaumer 23223* (F, M); 1917–1921, *Gaumer 23974* (F); April 1917, *Gaumer & Sons 23674* (F, M); *Millspaugh 25* (F).

CENTRAL AMERICA:

GUATEMALA: PETÉN: in Bajo Baxactun, April 22, 1931, *Bartlett 12695* (M); Remate, Lake Petén, March 25, 1933, *Lundell 2080* (F); Sabana San Francisco, La Libertad, April 4, 1933, *Lundell 2459* (F); La Libertad, April 28, 1933, *Lundell 3063*, and May 31, 1933, *3534* (F); Municipio de San José, April 14, 1933, *Pacheco 1485* (F).

BRITISH HONDURAS: Maskall, April 23, 1934, *Gentle 1212* (F, M); Maskall pine ridge, July 26, 1934, *Gentle 1352* (M); coastal region, Honey Camp, Oct. 14, 1929, *Lundell 592* (F); near Honey Camp, 1930, *Meyer 176* (F); BELIZE DISTRICT: Manatee pine ridge, 1931–1932, *Gentle 102* (F); SOUTHERN DISTRICT: All Pines, July 10, *Schipp 540* (F, M).

WEST INDIES:

CUBA: eastern Cuba, 1860–1864, *Wright 2289* (M); ORIENTE: in sylva, Aug. 3, 1915, *Ekman 6297* (F); limestone hills, south of Holquin, April 11, 1909, *Shafer 1317* (US); PINAR DEL RIO: Las Martinas to the Coast, Dec. 19, 1911, *Shafer 11120* (M, US); *Wright 2289* in part (US).

CURAÇAO: jagged limestone, St. Peter, March 20–27, 1913, *Britton & Shafer 3080* (US); on Tafelberg, Feb. 27, 1917, *Curran & Haman 148* (US).

DOMINICAN REPUBLIC: BARAHONA: Sept. 23, 1926, *Ekman 7062* (US); Hoya de Enriquillo, Jimaní, at Laguna del Fondo, April 4, 1928, *Ekman 9867* (US); May 1910, *Fuertes 32* (F, M, US).

HAITI: Carrefour-Fouché to Trouin, April 16, 1926, *Ekman 5869* (US); near Pétionville, alt. 350 m., June 15–28, 1920, *Leonard 11933* (US).

JAMAICA: Norbrook, June 3, 1895, *Campbell 5753*, and Feb. 28, 1896, *6195* (F); Long Mountain, March 9, 1900, *Harris* (F); Watson's Mill, Manchester, May 1, 1896, *Harris 6416* (F); Great Goat Island, April 19, 1906, *Harris 9224* (F, US); Lititz Savanna, Oct. 7, 1914, *Harris 11766* (F, M, US); Pigeon Island, 10 miles off Old Harbor Bay, April 6–7, 1920, *Maxon & Killip 1577* (F, US).

ACTINOCHEITA Barkley

Actinocheita Barkl., Ann. Mo. Bot. Gard. **24**: 2. 1937.

Rhus DC., Prodr. **2**: 67. 1825, in part; Turcz., Bull. Soc. Nat. Moscou **31**: 469. 1858, in part; A. DC., Calq. Dess. Fl. Mex. Moc. & Sessé, *t. 189.* 1874, in part; Hemsl., Biol. Cent.-Am. Bot. **1**: 217, 218. 1880, in part; Engler in DC., Monogr. Phaner. **4**: 383. 1883, in part; Sessé & Moc., Pl. Nov. Esp., p. 47. 1887, in part; ed. 2, p. 44. 1893, in part; Standl., Contr. U. S. Nat. Herb. [Trees & Shrubs Mex.] **23**: 665. 1923, in part.

Toxicodendron Kuntze, Rev. Gen. Pl., pt. 1, p. 153. 1891, in part.

Deciduous trees with few staghorn-like, ash-gray branches. Leaves alternate, imparipinnate, more or less persistent, clustered near the apex of the branches; leaflets many, densely pubescent, rugose; rachis not winged. Bracts of the inflorescence lanceolate, deciduous. Flowers polygamo-dioecious, in ascending panicles in the axils of the leaves, appearing with the leaves. Petals and sepals 5, spreading. Ovary 1-celled, raised upon a column formed by the disk and partly adherent to it; style 3-branched, terminal. Drupe almost symmetrical, clothed with long, soft, reddish hairs.

Type species: **Actinocheita filicina** (DC.) Barkl. *(Rhus Filicina* DC., Prodr. **2**: 67. 1825).

The seldom-collected, single species, of which this genus is composed, while resembling several members of the Rhus-complex in various features, is quite distinctive in its general aspect and morphology. It resembles SUMAC in its staghorn-like stems and deciduous leaves which are imparipinnately compound with many leaflets, but the leaves are more densely clustered near the apex and the leaflets are peculiarly rugose and crenate-lobed. The inflorescence is axillary, composing an open compound leafy panicle, also unlike that of SUMAC, where it is a dense terminal thyrsus. The situation of the ovary on a column is vaguely suggestive of the condition in *Anacardium*, but in the Rhus-complex it is found only in *Actinocheita.* Glabrous, short-pubescent, and glandular-pubescent fruits are found in the complex, but in no other genus do long, silky, simple hairs occur. It has been reported as poison to the touch.

1. **Actinocheita filicina** (DC.) Barkl., Ann. Mo. Bot. Gard. **24**: 2. 1937. Pl. 17, fig. 2.

Rhus Filicina DC., Prodr. **2**: 67. 1825; A. DC., Calq. Dess. Fl. Mex. Moc. & Sessé. *pl. 189*. 1874; Hemsl., Biol. Cent.-Am. Bot. **1**: 217. 1880.

R. potentillaefolia Turcz., Bull. Soc. Nat. Moscou **31**: 469. 1858; Hemsl., Biol. Cent.-Am. Bot. **1**: 218. 1880; *ibid.* **4**: 21. 1886, in note; Engler in DC., Monogr. Phaner. **4**: 383. 1883; Standl., Contr. U. S. Nat. Herb. [Trees & Shrubs Mex.] **23**: 669. 1923.

R. Tetlatziam Sessé & Moc., Pl. Nov. Esp., p. 47. 1887; ed. 2, p. 44. 1893.

Bursera bipinnata (Schlecht.) Engler in DC., Monogr. Phaner. **4**: 49. 1883, in part, as to *Rhus filicina* in syn.; Hemsl., Biol. Cent.-Am. Bot. **4**: 19. 1886, in part, as to *Rhus filicina* in syn.

Toxicodendron potentillifolium Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891.

Shrubs and small trees to 5 m. in height, with few staghorn-like branches covered with tuberculate leaf scars; branches ash-gray, glabrous below and densely pubescent at the apex, nude at base and clothed heavily near the summit with leaves; leaves alternate, rugose, imparipinnate, 9–33 cm. long, deciduous; leaflets 13–29, sessile, broadly linear, to 6 cm. long, sometimes as small as 0.5 cm., hoary-tomentose, lighter below, with revolute margins, lobes crenate, usually cristate-pointed, apex more or less acute, base truncate; rachis naked, densely pubescent; flowers polygamo-dioecious, disposed in ascending panicles half as long as the subtending leaves and appearing with them; bracts linear to subrotund, persistent, pilose-hirsute; sepals 5, deltoid-lanceolate, densely pubescent; stamens with thickened filaments longer than the ovoid anthers; pistil with 3 short styles, ovary on a torus formed by the disk, 1-celled, ovule anatropous; drupe almost symmetrical, villous, clothed with long, soft, violet-red hairs.

Type specimen: In all probability the original material on which this species was founded no longer exists; but the species is based primarily on *plate 189* of 'Calque des Dessins de la Flora du Mexique, de Mociño and Sessé,' 1874, and is typified by *Pringle 4752*, which is represented in the larger herbaria of America and Europe.

Distribution: Puebla, Guerrero, and Oaxaca, Mexico (fig. 6).

MEXICO: coll. of 1791, *Haenke 1503* (F).

GUERRERO: Acuitlapan, 1900 m., Oct. 1935, *Abbott 11* (G); mountains above Iguala, Oct. 4, 1900, *Pringle 9164* (F, G, M).

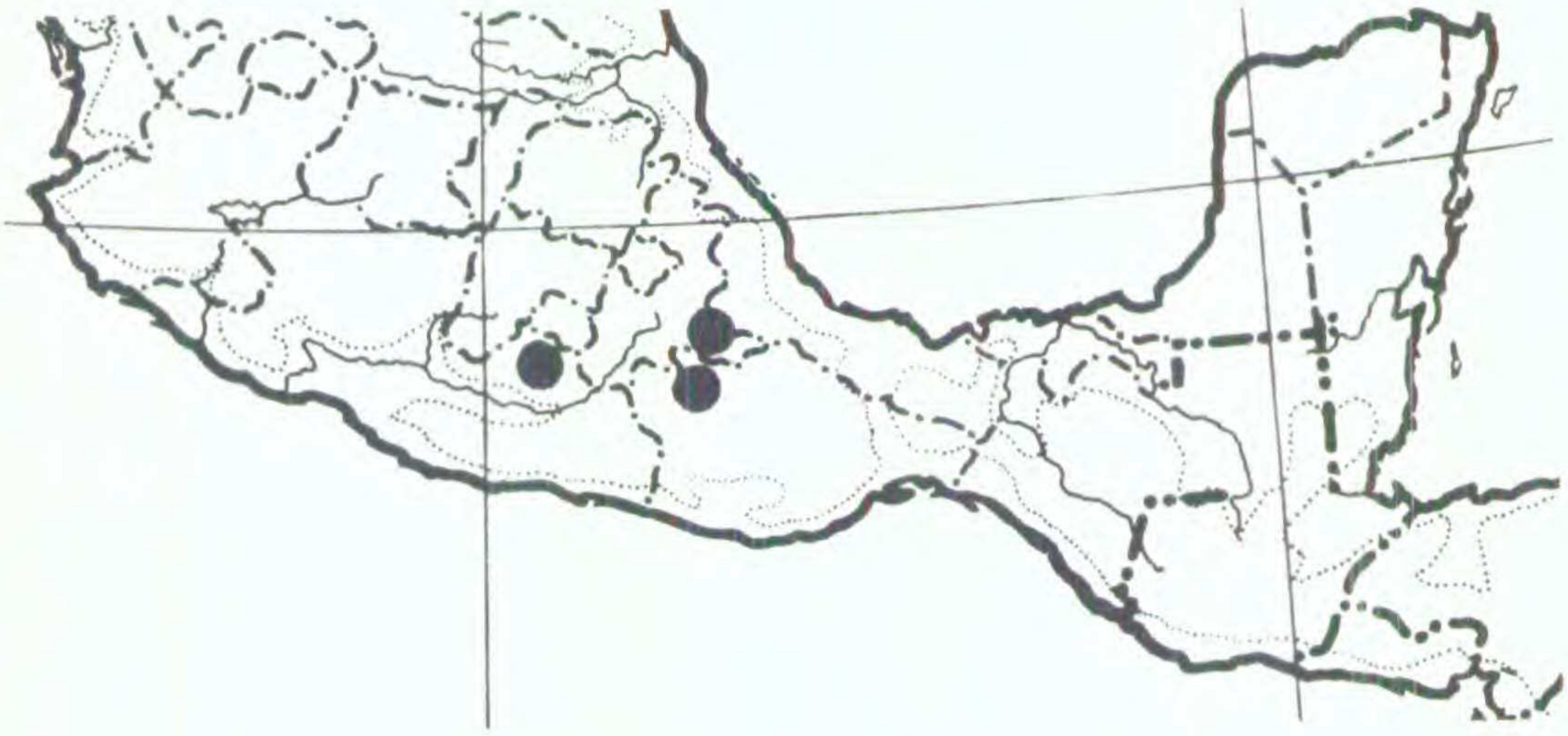

Fig. 6. Portion of Mexico, showing the geographic distribution of *Actinocheita filicina* (DC.) Barkl.

OAXACA: Cañon del Tomellin, Estacion de Almoloyas, Sept. 29, 1907, *Conzatti 2019* (F, NY); District of Nochixtlan, Cuesta de Henuadilla, *Conzatti 4247* (US); Cuesta de Nochixtlan, alt. 2000 m., May 1899, *Gonzalez & Conzatti 937* (G); six miles above Dominguillo, Oct. 3, 1893, *Nelson 1593* (US), and Oct. 30, 1894, *1825* (G, US, NY); limestone ledges, Tomellin Cañon, July 31, 1894, *Pringle 4752* (B, Calif, F, G, M, NY, PA, US); Nov. 27, 1895, *Seler 1419* (G, NY); Rio Seco, Necaltepec, alt. 3100 ft., Sept. 21, 1895, *Smith 777* (G).

PUEBLA: Tehuacan, June 1905, *Purpus 1236* (Calif, F, G, M, NY); Tlacuilotepec, May 1909, *Purpus 4065*, in part (F, G, M, NY); Tehuacan, Sept. 1911, *Purpus 5702* (Calif, M); Tehuacan, Aug. 1905, *Rose, Hough & Painter 9967* (G, NY, US).

RHUS [Tourn.] L., emend. Moench

Rhus Tourn., Inst. Rei Herb., p. 611. 1700; L., Sp. Pl. **1**: 265. 1753, in part, as to species 1, 2, 3, and 5; Gen. Pl., ed. 5, p. 129.

1754, excl. *Toxicodendron* and *Cotinus* Tourn.; Moench, Meth., p. 72. 1794; Jacq., Pl. Rar. Hort. Schoenb. **3**: 50. 1798, in part; Willd., Sp. Pl. **1**: 1477. 1798, in part; Brisseau-Mirbel & Jolyclerc, Hist. Nat. Pl. **17**: 176. 1806, as *rhus* in part; DC., Cat. Pl. Hort. Bot. Monsp., p. 55. 1813, in part; DC., Prodr. **2**: 67. 1825, sect. SUMAC in part; Hook., Fl., Bor.-Am. **1**: 126. 1830, sect. SUMAC in part; Endl., Gen. Pl., p. 1131. 1840, sect. SUMAC, *Rhus;* Ench. Bot., p. 599. 1841, sect. SUMAC, *Rhus;* Walp., Rep. Bot. Syst. **1**: 551. 1842, in part; Gray, Gen. Pl. U. S. **2**: 157. 1846, in part; Manual, p. 78. 1848, sect. SUMAC in part; Griseb., Cat. Pl. Cub., p. 67. 1866, in part; Engler, Bot. Jahrb. **1**: 379. 1881, sect. TRICHOCARPAE; Engler in DC., Monogr. Phaner. **4**: 376. 1883, sect. TRICHOCARPAE excl. *R. trichocarpa* & *R. potentillaefolia;* Gray (Wats. & Coult.), Manual, ed. 6, p. 118. 1889, sect. SUMAC; Dippel, Handb. Laubholzk. **2**: 376. 1892, in part; Engler in Engl. & Prantl, Nat. Pflanzenfam. **3**^{5}: 168. 1892, sect. TRICHOCARPAE excl. *R. trichocarpa;* Sargent, Sylva **3**: 13. 1892, in part; Koehne, Deutsche Dendrol., p. 359. 1893, sect. TRICHOCARPAE; Gray, Syn. Fl. N. Am. **1**: 383. 1897, sect. RHUS in part as to SUMAC; Britton, Manual, p. 600. 1901, in part; Piper, Contr. U. S. Nat. Herb. [Fl. Wash.] **11**: 383. 1906, in part; Coult. & Nels., New Man. Cent. Rocky Mts., p. 312. 1909, in part; Britt. & Brown, Illustr. Fl., ed. 2. **2**: 481. 1913; Small, Fl. Miami, p. 112. 1913; Woot. & Standl., Contr. U. S. Nat. Herb. [Fl. N. Mex.] **19**: 408. 1915; Rydb., Fl. Rocky Mts. & Adj. Plains, p. 550. 1917, and ed. 2. 1922; Key Rocky Mt. Fl., p. 152. 1919; Sargent, Manual, ed. 2. p. 660. 1922, in part; Standl., Contr. U. S. Nat. Herb. [Trees & Shrubs Mex.] **23**: 665. 1923, in part; Bailey, Man. Cult. Pl., p. 461. 1924; Jepson, Man. Fl. Pl. Calif., p. 607. 1925, in part; Tidestr., Contr. U. S. Nat. Herb. [Fl. Utah. & Nev.] **25**: 347. 1925, in part; Rehder, Man. Cult. Trees & Shrubs, p. 536. 1927, sects. SUMAC and LOBADIUM; Schaffn., Manual Ohio, p. 347. 1928; Rydb., Fl. Prair. & Plains, p. 526. 1932; Small, Manual Southeast. Fl., p. 809. 1933; Munz, Manual S. Calif. Bot., p. 292. 1935, in part; Jepson, Fl. Calif. **2**: 444. 1936, in part; Stem. & Myers, Okla. Fl., p. 296. 1937.

Cotinus M. Gomez de la Maza, El. Prog. Med. (Havana) **8:** 50. 1896, in part, non Mill. Gard. Dict., abrdg. ed. 4. 1754.

Lobadium Raf., Am. Month. Mag., p. 357. 1819; Jour. Phys. **89:** 98. 1819.

Neostyphonia Shafer in Britt., N. Am. Trees, p. 612. 1908; Abrams, Bull. N. Y. Bot. Gard. **6:** 403. 1910; Fl. Los Angeles, p. 219. 1917.

Rhoeidium Greene, Leafl. Bot. Obs. & Crit. **1:** 143. 1905; Woot. & Standl., Contr. U. S. Nat. Herb. [Fl. N. Mex.] **19:** 408. 1915.

Schmaltzia Desv., Jour. de Bot. Appl. **1:** 229. 1813; DC. Prodr. **2:** 72. 1825, as *Schmalzia* in syn.; Small, Fl. Southeast. U. S., p. 728. 1903; Greene, Leafl. Bot. Obs. & Crit. **1:** 128. 1905; Abrams, Bull. N. Y. Bot. Gard. **6:** 401. 1910; Britt. & Brown, Illustr. Fl., ed. 2. **2:** 482. 1913. Woot. & Standl., Contr. U. S. Nat. Herb. [Fl. N. Mex.] **19:** 406. 1915; Abrams, Fl. Los Angeles, p. 219. 1917; Schaffn., Manual Ohio, p. 348. 1928; Small, Manual Southeast. Fl., p. 811. 1933; Stem. & Myers, Okla. Fl. p. 298. 1937.

Styphonia Nutt. in Torr. & Gray, Fl. N. Am. **1:** 220. 1838; Endl., Gen. Pl., p. 1131. 1840; Ench. Bot., p. 599. 1841; Walp., Rep. Bot. Syst. **1:** 555. 1842; Nutt., N. Am. Sylva **3:** 4. 1849; Hemsl., Biol. Cent.-Am. Bot. **1:** 218. 1880, as *Stiphonia.*

Toxicodendron Kuntze, Rev. Gen. Pl., pt. 1, p. 153. 1891, in part.

Turpinia Raf., Med. Repos. N. Y. **5:** 352. 1808; Desv., Jour. de Bot. **2:** 166. 1809.

Innocuous, mostly deciduous shrubs and small trees. Leaves alternate, simple, ternate or imparipinnate, mostly thin, rachis terete or winged. Flowers numerous, mostly polygamodioecious, in terminal thyrsi or in lateral and terminal compound spikes. Bracts of the inflorescence lanceolate or ovate, deciduous or persistent. Calyx of 5 sepals, mostly persistent. Petals 5, ascending. Ovary 1-celled, sessile on the disk; style terminal, 3-parted. Drupes red, about as broad as long, slightly compressed, pubescent with glandular hairs, or with simple and glandular hairs; mesocarp not ceriferous.

North America, Asia, and southern Europe.

Type species: **Rhus Coriaria** L., Sp. Pl. **1**: 265. 1753.

Rhus as here delimited is composed of two very diverse elements: SUMAC having stout branches, thyrsoid inflorescences, and intermingled red glandular and red-stained pubescence on the fruit-coat; and SCHMALTZIA having comparatively slender branches, spicate inflorescences, and intermingled hyaline and red glandular pubescence on the fruit-coat. While these elements might be almost equally well treated as genera, it seems best for the present at least to treat them as subgenera.

KEY TO SUBGENERA

Flowers in dense terminal thyrsi, appearing after the leaves; bracts linear-lanceolate, deciduous, one subtending each flower; bracteoles absent; flowers short-pedicellate; fruit with red glandular pubescence and deeply red-stained hairs .... SUMAC

Flowers in terminal compound spikes, appearing with or before the leaves; bracts deltoid or ovate, persistent, one bract and two bracteoles subtending each flower; flowers sessile or rarely short-pedicellate; fruit with red glandular pubescence and hyaline hairs .... SCHMALTZIA

Subgenus SUMAC (DC.) Schneider

SUMAC DC., Prodr. **2**: 67. 1825, as section, in part; Koehne, Deutsche Dendrol. p. 359. 1893, as subsection; Schneid., Illustr. Handb. Laubholzk. **2**: 153. 1907, as subgenus; Rehder, Man. Cult. Trees & Shrubs, p. 537. 1927, as section.

Trichocarpae Engler, Bot. Jahrb. **1**: 379. 1881, as section, in part.

Erect shrubs and small trees with comparatively few staghorn-like branches. Leaves alternate, pinnately compound, deciduous; leaflets sessile; rachis winged or not. Inflorescences thyrsoid, mostly terminal. Flowers numerous, mostly polygamous, pedicellate, each usually subtended by a small thin, lanceolate bract. Drupes red; epicarp pubescent with red glandular and deeply red-stained hairs.

North America, Asia, and southern Europe.

Type species: **Rhus Coriaria** L., Sp. Pl. **1**: 265. 1753.

SUMAC is a very natural group of shrubs and trees distributed in Europe, Asia, and North America.

KEY TO SPECIES AND VARIETIES

Rachis winged; leaflets mostly entire.

Rachis and its wings on at least some of the leaves over 4 cm. broad........ ....1. *R. Copallina*

Rachis and its wings usually less than 3.5 mm. broad.

Leaflets ovate-lanceolate, not strongly falcate, 17–27, with leaflets obtuse or acute..........1a. *R. Copallina* var. *leucantha*

Leaflets linear-lanceolate, strongly falcate, 13–19, with leaflets acuminate ....2. *R. lanceolata*

Rachis not winged (except in *R. Michauxii); leaflets* mostly toothed.

Uppermost rachis segment narrowly winged; leaflets ovate, subcordate at base..........3. *R. Michauxii*

Uppermost rachis segments not winged; leaflets lanceolate, usually subcuneate at base.

Twigs and petioles densely villous-pubescent with long spreading hairs.

Leaflets serrate..........4. *R. typhina*

Leaflets laciniate..........4a. *R. typhina* var. *laciniata*

Twigs and petioles glabrous or puberulent, not villous-pubescent (or sparsely so in *R. glabra* var. *Sandbergii).*

Fruits covered with long red hairs exceeding 1 mm. in length; branches at first puberulent..........5. *R. pulvinata*

Fruits covered with short red hairs less than .5 mm. in length; branches glabrous or sparsely villous-pubescent.

Fruits covered with very short glandular hairs about .2 mm. in length; branches glabrous; leaflets serrate, subentire, or laciniate.

Leaflets serrate or subentire..........6. *R. glabra*

Leaflets laciniate..........6a. *R. glabra* var. *laciniata*

Fruits covered with longer hairs, about .5 mm. in length; branches glabrous or sparsely villous-pubescent; leaflets serrate or dentate.

Leaflets mostly 7–13, small, serrate, light green; branches sparsely pilose..........6b. *R. glabra* var. *borealis*

Leaflets mostly 11–17, large, dentate, dark green; branches glabrous ....7. *R. Ashei*

1. **Rhus Copallina** L., Sp. Pl. **1**: 266. 1753; Gmel. in L., Syst. Nat., ed. 13. **3**: 1615. 1793, as *R. corallina.*

Rhus copallina var. *latifolia* forma *latialata* Engler in DC., Monogr. Phaner. **4**: 384. 1883.

R. copallina var. *extensa* Sprenger, Mitt. Deutsch Dendr. Ges. for 1907, p. 67. 1907.

R. copallina var. *arborescens* Demcker, *ibid.* for 1909, p. 325. 1909.

R. copallina var. *salicifolia* Demcker, *ibid.*

R. copallina var. *nesophila* House, Bull. N. Y. State Mus., Nos. 243–244: 55. 1923.

R. copallina forma *crispa* Farwell, Papers Mich. Acad. Sci. **1**: 95. 1923.

R. pistachiaefolia Salisb., Prodr., p. 169. 1796.

R. lentiscifolia Stokes, Bot. Mat. Med. **2**: 164. 1812.

Schmaltzia copallina Small, Fl. Southeast. U. S., pp. 728, 1334. 1903.

Toxicodendron copallinum Kuntze, Rev. Gen. Pl., pt. 1, p. 153. 1891.

T. copallinum var. *latifolium* Kuntze, *ibid.*, p. 154.

Large shrubs with comparatively slender branches; older branches with numerous conspicuous lenticels, glabrate, the new branches villous-tomentose, buds tan, lanuginose; leaves compound; leaflets 7–17, lanceolate-elliptic or lanceolate-ovate, thin, subrevolute, green, glabrous or sparsely pilose and shining above, somewhat lighter, dull, pilose and glandular-hairy beneath, entire or subserrate-margined, lateral leaflets sessile, 2.5–8.5 cm. long, 1.4–2.8 cm. broad, at apex acute or less often acuminate (or those of uppermost and lowermost leaves obtuse or mucronate), base usually somewhat unequally cuneate, less often unequal and rounded, terminal leaflets sessile or long-petiolulate, 4.5–8 cm. long, 1.5–3 cm. broad, lanceolate-ovate at apex, obtuse or subcuneate at base; terminal petiolule 0–1.5 cm. long, broadly winged, rachis segments about 1.5–2.5 cm. long, winged, the uppermost broadly so, petioles 3–6 cm. long; inflorescence a large terminal thyrsus about 12 cm. long, 10 cm. broad, bracts lanceolate, 0.5–1.5 mm. long, 0.2–0.6 mm. broad, rounded at the apex, pilose on the outer surface and very sparsely pilose within with simple hairs, ciliate with simple hairs, deciduous; flowers many, pedicels about 1.7 mm. long, each flower subtended by a single bract; sepals deltoid, subacute, 1.2 mm. long, 1.1 mm. broad, pilose on the outer surface and glabrous on the inner, ciliate with simple and glandular hairs, persistent; petals greenish-white in the dried state, about 2–2.5 mm. long, 1–1.2 mm. broad, glabrous on the outer surface, a few hairs on the inner, ciliate with simple and glandular hairs, deciduous; filaments longer than the sepals, anthers lanceolate, 1.2–2 mm. long, 0.8 mm. broad; stigmas 3, styles 3; fruit 4 mm. long and 4 mm. broad, somewhat flattened, red, pilose, and with red glandular hairs; seed 2.5 mm. long, 2.5 mm. broad, smooth or somewhat roughened, usually larger at one end.

Rhus Copallina is a widespread species of eastern North America. Typically it has broadly winged rachis, few-foliolate leaves, with broadly lanceolate, acute leaflets which are shining above and often entire or serrate, even in the same leaf. There is some indication that it may hybridize with its variety and with *Rhus lanceolata.*

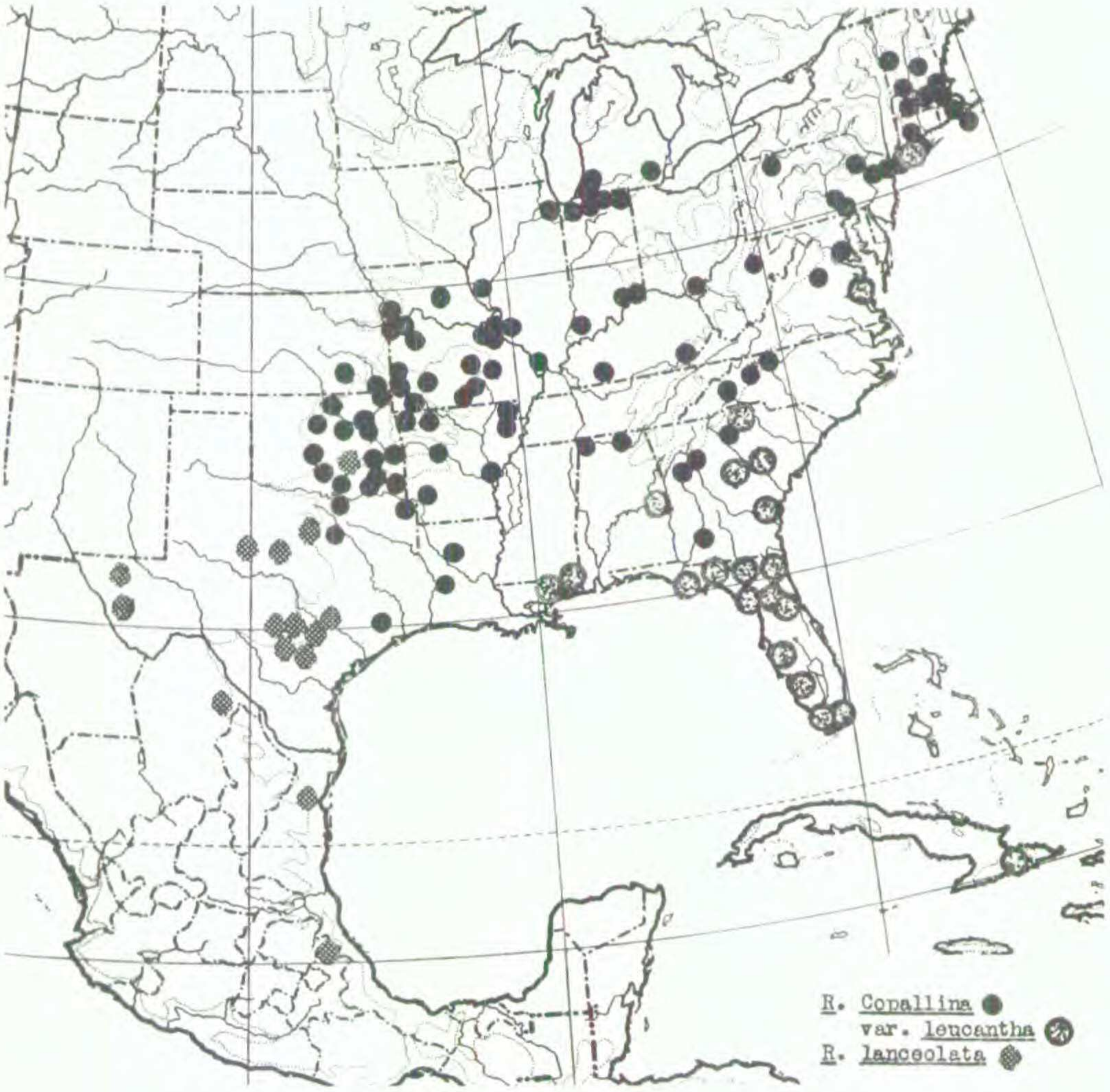

Fig. 7. The geographic distribution of *Rhus Copallina* L., *R. Copallina* var. *leucantha* (Jacq.) DC., and *R. lanceolata* (Gray) Engler.

Distribution: New Hampshire to Georgia, west to Michigan, Missouri, and Texas (fig. 7).

UNITED STATES:

New Hampshire: thicket in pasture, Hookset, Aug. 16, 1925, *Batchelder* (M).

Vermont: sandy field near Scanlon Swamp, alt. 475 ft., Sept. 16, 1924, *Dutton* (M); dry ledge, Benson, June 27, 1923, *Knowlton* (M).

Massachusetts: Nonquitt, Aug. 3, 1888, *Sturtevant* (M); sandy woods, near Indian Hill, Lamberts Cove, Aug. 26, 1927, *Fogg* (M); Sunderland, Aug. 7, 1887, *Churchill* (M); Montague, Aug. 9, 1887, *Churchill*, and June 12, 1888 (M); roadside thicket, region of Ashley Pond, Holyoke, Sept. 7, 1926, *Seymour 607* (M); between South Sudbury and Framingham, Aug. 2, 1903, *Greenman 2104* (M); Lincoln, Aug. 23, 1903, *Greenman 2145* (M); Framingham, June 25, 1897, *Smith* (M); Randolph, Aug. 10, 1884, *Churchill*, and Aug. 4, 1889 (M); Harland Street, Milton, Oct. 1, 1898, *Churchill* (M); Douglass, May 30, 1934, *Weatherby, Smith, Harris & Rossbach 2783* (M).

Connecticut: New Haven, Oct. 1902, *Baker* (M).

New York: thickets, Ocean Side, Sept. 20, 1917, *House* (A type of *R. copallina* var. *nesophila);* Hempstead Plains, Long Island, Sept. 7, 1892, *von Schrenk* (M).

New Jersey: sandy plains, Manchester, Sept. 1, 1870, *Redfield 1159* (M); Cape May, Sept. 9, 1879, *Redfield* (M); Livingston, July 25, 1907, *Lighthipe* (M); in thicket along roadside, Watchung, July 22, 1930, *Moldenke 1318* (M, NY); from a glacial marsh, Westfield, Aug. 16, 1925, *Drushel 5351* (M).

Pennsylvania: Fruitville Pike, Oct. 1892, *Eby* (M); July 8, 1883, *Galen 362* (M); Penryn, Aug. 1890, *Eby* (M); between Churchtown Road and Beartown, Sept. 6, 1892, *Heller 524* (M, ND); Mount Gretna, May 1889, *Eby* (M); Mount Alton, 1909, *Illick*, and July 20, 1909 (M); Pocono Plateau, July 21, 1904, *Harshberger* (M).

Delaware: along Little Duck Creek, near Leipsic, Aug. 2, 1934, *Larsen 773* (M).

Maryland: near Plummers Island, July 20, 1917, *Nieuwland* (M); beyond Riverdale, Aug. 5, 1905, *Greene* (ND); Riverdale, Aug. 18, 1899, *Palmer* (M).

District of Columbia: summer 1906, *Greene* (ND); along canal near High Island, Aug. 6, 1905, *House 1359* (M); Brookland, July 29, 1910, *Nieuwland 657* (ND); Washington, Sept. 1896, *Tidestrom* (ND).

Virginia: Arlington, Aug. 1, 1880, *Trelease* (M); Eckington, July 29, 1891, *Blanchard* (M).

North Carolina: dry woodlands, Biltmore, Aug. 9, 1897, *ex Biltmore Herb. 3284a* (M); summit of Stone Mountain, July 31, 1891, *Small & Heller 339* (M); north of Mount Airy, June 21, 1909, *Rusby* (NY).

South Carolina: hedges, suburbs of Anderson, Aug. 11, 1917, *Davis 7776* (M); fertilizer mill near Anderson, Aug. 18, 1917, *Davis* (M); Stephenson's farm, suburbs of Anderson, Oct. 9, 1918, *Davis 7878* (ND); woods, Anderson, July 15, 1919, *Davis 8409* (M); dry roadsides, Anderson, Aug. 25, 1919, *Davis 5281* (M).

Georgia: Stone Mountain, May 30, 1933, *Miller, Perry, Boyd & Myers 544* (M); hedges and fence rows, Dr. Gillespie's Pocoson place, May 1, 1928, *Gillespie 4920*, and May 16, 1928, *5032* (ND); Gwinnett Co., near McGuire's mill, Yellow River, alt. 750 ft., July 11, 1893, *Small* (F).

Alabama: hills near South Florence, July 21, 1899, *Eggert* (M); Huntsville, 1891, *Shimek* (M); Monte Sano, Huntsville, 1891, *Shimek* (M).

Mississippi: Askerman, June 1905, *Jensen 16* (M); Ocean Springs, Aug. 3, 1900, *Tracy 7012* (F, M).

LOUISIANA: border of woods near St. Martinsville, July 10, 1893, *Langlois* (ND); low woods, Lake Charles, Sept. 11, 1915, *Palmer 8518* (M); upland woods, Natchitoches, Sept. 28, 1915, *Palmer 8724* (M).

OHIO: open hillsides, Roosevelt Game Reserve, Friendship, July 29, 1934, *Demaree 10791* (M).

WEST VIRGINIA: Upshur Co., Aug. 1, 1896, *Pollock* (M).

MICHIGAN: Grand Beach, June 19, 1911, *Nieuwland 872* (ND); north of Bankson, Sept. 1, 1914, *Nieuwland 14078* (ND); sandy hill, Lawton, Sept. 9, 1928, *Anderson* (M); 7-mile road, Detroit, Sept. 13, 1911, *Nieuwland 1685* (ND).

INDIANA: north of Brookland, Aug. 18, 1911, *Nieuwland* (M); sandy roadside, Hunter Lake, Sept. 12, 1923, *Deam 39669* (Deam); woods near Grayford, July 23, 1922, *Deam 37053* (Deam); on a dune about 2 miles east of Indiana Harbor, Sept. 23, 1906, *Deam 1716* (Deam); Miller, Aug. 20, 1908, *Greenman*, and *3174*, *3175* (M); Osborn, Aug. 15, 1911, *Greenman* (M); Miller, Aug. 1884, *Ohlendorf* (M); sand-dune woods, Miller, Aug. 20, 1913, *Smith 5774* (M); Lake Maxinkuckee, Sept. 15, 1906, *Clark* (ND); sand, east side Lost Lake outlet, Lake Maxinkuckee, Oct. 8, 1906, *Clark* (ND); border of a wooded ravine near Otwell, Sept. 23, 1932, *Deam 53329* (Deam); Mineral Springs, Sept. 25, 1913, *Nieuwland 11651* (ND); Notre Dame, 1908, *Nieuwland 2457* (ND); road to Red Mill, Notre Dame, Aug. 6, 1909, *Nieuwland 371* (ND); open wooded hillsides about Hogback Lake, July 15, 1906, *Deam* (M); in a low place on the border of a wood about 1 mile southeast of Fairview, July 20, 1929, *Deam 47434* (Deam).

KENTUCKY: Pine Mountain, Harlan Co., Aug. 1893, *Kearney 143* (M); Bowling Green, Oct. 20, 1899, *Price* (M).

TENNESSEE: near Parrotsville, Sept. 29, 1906, *Norton* (ND).

ILLINOIS: rocky open hillsides, Belknap, May 13, 1919, *Palmer 15135* (M); "in Wäldern," St. Clair, July 24, 1879, *Eggert*, and Aug. 26, 1879 (M); Shepherd, Sept. 23, 1914, *Davis 3218* (M).

MISSOURI: barrens on the Meramec, June 1833, *Engelmann* (M); woods, Eagle Rock, Aug. 8, 1905, *Bush 3164* (M); Lamar, Sept. 1933, *Warner 4* (M); Poplar Bluff, July 1893, *Eby* (M); edge of prairie, Aug. 15, 1865, *Broadhead* (M); common in woods, Harlem, July 23, 1899, *Mackenzie* (M); Rhyse, July 29, 1928, *Kellogg 1850* (M); Springfield, July 31, 1892, *Dewait* (M); rocky open ground, Willow Springs, July 8, 1914, *Palmer 6221* (M); Iron Mountain Lake, July 24, 1927, *Kellogg 1030*, and June 22, 1928, *1851* (M); Pilot Knob, June 17, 1888, *Pammel* (M); dry hills, Pilot Knob, July 1897, *Russell* (M); Jackson Co., Oct. 11, 1892, *Bush* (M); Swope Park, July 4, 1896, *Bush 885* (ND); Webb City, Aug. 18, 1901, *Palmer 15* (M); very common on dry prairies, Webb City, July 24, 1903, *Palmer 959* (M); near Orongo, Aug. 23, 1926, *Palmer 31485* (M); Shoal Creek, Joplin, Oct. 7, 1897, *Trelease 248* (M); Festus, Oct. 23, 1936, *Barkley 1092* (M); Columbus, June 21, 1930, *Palmer 36673* (M); Mount Airy, July 1833, *Engelmann* (M); common in woods, Pleasant Grove, Aug. 12, 1899, *Bush 270* (M); Prospect Hill at brick kilns, St. Louis, Oct. 26, 1896, *ex Glatfelter Herb.* (M); St. Louis, Aug. 1838, *Riehl 156* (M); mouth of Meramec, St. Louis Co., July 5, 1891, *ex Glatfelter Herb.* (M); Watson Road 7 miles from St. Louis, July 20, 1893, *ex Glatfelter Herb.*, and 1894 (M); Bach's Crossing, Meramec Highlands, June 26, 1910, *Craig* (M); Meramec Station, July 22, 1879, *Eggert* (M); hills Valley Park, July 24, 1879, *Eggert*, and Aug. 21, 1879 (M); Allenton, Aug. 28, 1884, *Kellogg* (M); Allenton, July 18, 1884, *Letterman*, and Aug. 1, 1894 (M); Meramec

Highlands, Sept. 9, 1896, *Pammel* (M); Kirkwood, July 18, 1926, *Woodson 742* (M); common, Montier, June 30, 1894, *Bush 142* (M); Potosi, July 24, 1885, *Wislizenus 57* (M).

ARKANSAS: Benton Co., *Plank* (M); Eureka Springs, July 16, 1898, *ex Glatfelter Herb.* (M); Eureka Springs, May 7, 1903, *Gurney* (M); Piggott, Aug. 11, 1927, *Demaree 4129* (M); Jonesboro, June 29, 1929, *Demaree 6950* (M); McNab, Sept. 9, 1919, *Palmer 16332* (M); Wheatley to Brinkley, Sept. 1, 1934, *Demaree 10905* (M); near Nogo, Aug. 15, 1932, *Merrill 3* (M).

KANSAS: Cherokee Co., 1896, *Hitchcock 645a* (M); Olathe, July 1892, *Hitchcock* (M); copses, Wilson Co., 1896, *Haller 645* (M).

OKLAHOMA: common, Red River bottoms, near Grant, June 5, 1916, *Houghton 4045* (M); east of Norman, July 15, 1928, *Barkley 414* (Okla); southwest of Norman, July 11, 1924, *Bayliff* (Okla); east of Norman, July, *Clifton 73* (Okla); roadside south of Norman, May 10, 1930, *Cowan 73* (Okla); east of Noble, June 29, 1922, *Jeffs* (Okla); pasture between Norman and Noble, July 8, 1928, *Martin 85* (Okla); Sapulpa, July 22, 1894, *Bush 175* (M); open woods along Washita River, near Davis, July 29, 1933, *Palmer 42042* (M); rocky ground, Tishomingo, Sept. 10, 1914, *Palmer 6489* (M); dry hillsides and sways, east of Gowen, June 12, 1930, *Clark 2720* (Okla); near Page, July 11, 1914, *Blakley 1516* (M); Guthrie, July 8, 1893, *Waugh* (M); McCurtain Co., June 5, 1930, *Little & Olmsted 7*, and June 16, 1930 (Okla); near Muskogee, July 25, 1926, *Little 242* (Okla); at edge of woods, Pawhuska, Aug. 9, 1913, *Stevens 1998* (M); along stream, Commerce, Aug. 4, 1929, *Bush 10146* (M); 6 miles east of Miami, July 1928, *Whaley 111* (Okla); Stillwater, July 12, 1893, *Waugh*, and *133* (M); east of Trousdale, June 6, 1932, *Barkley 229* (Okla); in woods east of Finley, June 23, 1919, *Jeffs* (Okla); Dawson, July 8, 1928, *Myers 111* (Okla).

TEXAS: woods near Buchanan, June 13, 1898, *Eggert* (M); south of Dallas, July 16, 1898, *ex Glatfelter Herb.* (M); common in bottoms, Dallas, Sept. 26, 1900, *Bush 1117* (M); Hutchins, June 20, 1900, *Reverchon 1933* (M); Denison, Oct. 28, 1933, *Griggs 44* (M); Houston, June 20, 1872, *Hall 77* (M); Houston, June 1842, *Lindheimer* (M); Willis, *Warner* (M).

1a. Rhus Copallina L. var. **leucantha** DC., Prodr. **2**: 68. 1825.

Rhus Copallina var., Griseb., Cat. Pl. Cub., p. 301. 1866.

R. copallina var. *latifolia* forma *angustialata* Engler in DC., Monogr. Phaner. **4**: 384. 1883.

R. leucantha Jacq., Pl. Rar. Hort. Schoenb. **3**: 50. 1798.

R. obtusifolia Small, Fl. Miami, p. 112. 1913.

Cotinus Copallinus M. Gomez de la Maza, El Prog. Med. (Havana) **8**: 50. 1896.

Schmaltzia obtusifolia Small, Fl. Southeast. U. S., pp. 729, 1334. 1903.

S. leucantha Small, *ibid.*, ed. 2, pp. 1350, 1375. 1913.

Twigs usually slender; leaflets 17–27, thin to subcoriaceous, revolute and entire or subserrate-margined, somewhat pallid and sparse-pilose below, lateral leaflets oblong-lanceolate or oblong-elliptic, 2–5.5 cm. long, 0.7–1.5 cm. broad, at apex obtuse or acute, obliquely cuneate at base, terminal leaflets sessile or long-petiolulate, lanceolate.

This variety, which occurs (fig. 7) in southeastern United States and in parts of the West Indies, differs from the species by having more and smaller leaflets, which are usually more revolute. In some specimens the leaflets are mostly obtuse and in others mostly acute.

UNITED STATES:

NEW YORK: Cush's Pond, Long Island, Sept. 23, 1876, *Schrenk* (M).

VIRGINIA: vicinity of Williamsburg, Aug. 27, 1912, *Sargent, Thayer & Smith* (M).

SOUTH CAROLINA: hills north of Vaucluse, Aug. 6, 1898, *Eggert* (M); Whitner Park, Anderson, Sept. 9, 1919, *Davis* (M).

GEORGIA: vicinity of Thomson, Aug. 18, 1907, *Bartlett 1153* (Deam); Darien, May 24, 1909, *Smith 2102* (F).

FLORIDA: Corkscrew River, Sept. 1878, *Garber* (F); Lake City, Aug. 29–31, 1895, *Nash 2497* (F, M, ND); Lake City, June 28, 1893, *Quaintance* (M); Lake City, Sept. 14, 1894, *Rolfs 544*, and Aug. 6, 1895, *654* (F, M); Coral Gables, Feb. 13, 1933, *Demaree 10238* (M); Miami, March 1903, *Hitchcock* (F); near Jacksonville, Aug. 21 and Sept. 24, 1894, *Curtiss 5129* (M); Apalachicola, *ex Chapman Herb.* (M); Jefferson Co., June–July 1898, *Hitchcock* (F); near Eustis, Aug. 16–25, 1894, *Nash 1659* (F, M, ND); Marco, July–Aug. 1900, *Hitchcock* (F); Fort Myers, July–Aug. 1900, *Hitchcock 38* (F, M); Bocagrande, Nov. 1913, *von Schrenk* (M); Cedar Keys, *Palmer (95) 1160* (M); near Manatee, Aug. 20 and Sept. 9, 1898, *Simpson 51* (F); Orange Springs, Dec. 29, 1906, *Mill* (M); Long Key, May 6, 1908, *Bessey 117* (M); near Pine Crest, Jan. 6, 1930, *Moldenke 367* (M).

ALABAMA: Macons Mills, Aug. 20, *Baker* (M); Auburn, Aug. 11, 1897, *Earle & Baker* (M).

MISSISSIPPI: Biloxi, Aug. 1, 1896, *Pollard 1142* (F, M, ND); Cat Island, Aug. 26, 1900, *Tracy & Lloyd 274* (F, M); Ocean Springs, Aug. 7, 1895, *Skehan* (M).

WEST INDIES:

CUBA: 1860–1864, *Wright 2290* (M); PINAR DEL RIO: San Diego de los Baños, Aug. 31–Sept. 3, 1910, *Britton, Earle & Gager 6762* (US); mountains north of San Diego de los Baños, April 16, 1900, *Palmer & Riley 555* (US); Arroyo del Sumidero, Aug. 7–9, 1912, *Shafer & Leon 13671* (US).

2. **Rhus lanceolata** Gray ex Engler in DC., Monogr. Phaner. **4**: 384. 1883, in syn.; Britton, N. Am. Trees, p. 606. 1908.

Rhus Copallina var. *lanceolata* Gray, Bost. Jour. Nat. Hist. [Plant. Lindh. II] **6**: 158. 1850.

R. copallina var. *angustifolia* Engler in DC., Monogr. Phaner. **4**: 384. 1883.

R. copallina var. *angustifolia* forma *integrifolia* Engler in DC., *ibid.*, excl. specim. *Rugel 77a.*

R. copallina var. *angustifolia* forma *serrata* Engler in DC., *ibid.*

Schmaltzia lanceolata Small, Fl. Southeast. U. S., pp. 728, 1334. 1903.

A small tree about 10 m. tall with slender branches; older branches with numerous lenticels on the brown bark, the newer ones villous, soon glabrate, buds whitish, tomentose; leaves compound; leaflets 13–19, linear-lanceolate, falcate with the abaxial side wider than the adaxial, thin, subrevolute, entire or subserrate-margined, green and shining above, lighter and dull, pilose and somewhat glandular-hairy below, lateral leaflets sessile, 3–5.5 cm. long, 0.7–1.2 cm. broad, near the apex long-acuminate or only acuminate, base unequal, cuneate, terminal leaflets sessile or long-petiolulate, 3–4 cm. long, 0.5–0.7 cm. broad, long-acuminate, base cuneate or rarely narrowly rounded; terminal petiolule 0–0.7 cm. long, winged rachis segments about 1.3–1.7 cm. long, winged although the lower often obscurely so, petioles 2.5–3.5 cm. long; inflorescence a large terminal thyrsus about 10 cm. long, 7 cm. broad, bracts ovate, 1.3 mm. long, 1.1 mm. broad, round at the apex, pilose on the outer surface and glabrous on the inner surface, ciliate with simple hairs, deciduous; flowers many, each subtended by a single bract, pedicels 1.5 mm. long; sepals deltoid, subacute, 1.2 mm. long, 0.9 mm. broad, pilose on outer surface and glabrous on the inner surface, ciliate with simple and glandular hairs, persistent; petals whitish in the dried state, about 3 mm. long, 1 mm. broad, glabrous on the outer surface and with a few hairs on the inner surface, ciliate with simple and glandular hairs, deciduous; filaments very long, anthers lanceolate, 2 mm. long, 1 mm. broad; stigmas 3, styles 3; fruit 3.5 mm. long, 4 mm. broad, somewhat flattened, red; seed 3 mm. long, 2 mm. broad, smooth, slightly larger at one end.

Rhus lanceolata occurs along water-courses from Oklahoma to Mexico (fig. 7). Its leaflets are typically falcate and linear-lanceolate. In the Mexican portion of the range they tend to be less falcate and slightly broader.

Distribution: in the United States, Oklahoma and Texas, to Puebla, Mexico.

UNITED STATES:

OKLAHOMA: near Turner Falls State Park, Arbuckle Mts., July 29, 1933, *Palmer 42024* (M).

TEXAS: *Reverchon 153* (M); Edwards Plateau, near San Antonio, *Mackensen 33* (F); near Brownwood, Nov. 1, 1924, *Palmer 26811*, and Nov. 1, 1925, *29516* (M); Baird, Sept. 30, 1918, *Palmer 14543* (M); New Braunfels, July, 1846, *Lindheimer 244*, and *344 (243)*, and Aug. 1846, *345 (243)* (M); Comanche Spring, New Braunfels, July 1850, *Lindheimer 728* (F, M); near Frijole, alt. 5520 ft., Aug. 10, 1930, *Grassl 174* (F); Dallas, Sept. 26, 1900, *Bush 1116* (M); Dallas, June 15, 1898, *ex Glatfelter Herb.* (M); Dallas, Aug. 1881 or July 26, 1882, *Letterman*, and Aug. 1882 (M); Dallas, Aug. and Sept., *Reverchon (Curtiss 444)* (F, M), July 1883, and July and Sept. 1886, *152* (F); Hutchins, Aug. 10, 1900, *ex Reverchon Herb.* (M); Dallas, Aug. 10, 1900, *Reverchon*, and Aug. 10 and 22, 1900, *1932*, and Aug. 22, 1900, and Sept. 26, 1900, *1932B* (M); Gillespie Co., *ex Jermy Herb. 699* (M); Granbury, Sept. 15, 1914, *Palmer 6526* (F, M); upper Limpia Canyon, Davis Mts., June 11, 1926, *Palmer 30882* (M); Davis Mts., Oct. 9, 1926, *Palmer 32140* (M); Nolan Co., Aug. 4, 1934, *Barkley 1075* (M); 20 miles south of Sweetwater, Aug. 5, 1934, *Goodman 2252* (M); Sweetwater, May 29, 1918, *Palmer 13802* (M); Strawn, June 26, 1918, *Palmer 14244* (M); Lake Worth, Sept. 4, 1920, *Ruth*, and *778* (F); Austin, Aug. 19, 1886, *Letterman* (M); Austin, Sept. 22, 1916, *Palmer 10769* (M); Austin, Aug. 10, 1925, *Schulz 2350* (F).

MEXICO:

COAHUILA: Del Carmen Mts., Aug. 9, 1936, *Marsh 636* (F); Rancho Agua Dulce, Municipio de Musquiz, July 2, 1936, *Wynd & Mueller 416* (M).

PUEBLA: Pahuatlan, July 12, 1913, *Salazar* (US).

TAMAULIPAS: near crest of range above Mesa de Tierra, Sierra de San Carlos, vicinity of San José, July 12, 1930, *Bartlett 10269* (F, US); Cerro Barril, near San José, Sierra de San Carlos, alt. 4600 ft., July 19, 1930, *Bartlett 10491* (US).

3. **Rhus Michauxii** Sargent, Gard. & For. **8**: 404. 1895.

Rhus pumilum Michx., Fl. Bor.-Am. **1**: 182. 1803, non Meerb., Pl. Sel. Ic., *pl. 14.* 1798.

Schmaltzia Michauxii Small, Fl. Southeast. U. S., pp. 729, 1334. 1903.

Toxicodendron pumilum Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891, non Greene, Leafl. Bot. Obs. & Crit. **1**: 124. 1905.

A low shrub with stout twigs; branches puberulent and hirsute, the older almost glabrate, sparsely lenticellate, buds tan, lanuginose; leaves compound; leaflets 9–21, usually about 13, ovate to lanceolate-elliptic, thin, subrevolute, margin dentate or serrate-dentate, green and sparsely pilose above, somewhat lighter and densely ferruginous-pilose below, lateral leaflets sessile, 4–9 cm. long, 2–4.5 cm. broad, apex acute to subacuminate, base subcordate, terminal leaflets 5–9 cm. long, 2–5.5 cm. broad, apex subacute to subacuminate, base subcordate; petiolules usually winged, pilose, terminal 1–2.5 cm. long, rachis segments about 3 cm. long, petioles about 8 cm. long, stout, pilose; inflorescence a large terminal thyrsus about 12 cm. long, 8 cm. broad, bracts deltoid-lanceolate, 1 mm. long, 0.4 mm. broad, pointed at the apex, pilose on the outer surface and glabrous on the inner, ciliate with simple hairs, deciduous; flowers many, polygamo-dioecious, pedicels 1 mm. long; sepals lanceolate, 1.5 mm. long, 0.7 mm. broad, sparsely pilose and somewhat glandular pubescent without, glabrous on the inner surface, not ciliate, persistent; petals yellowish-white in the dried state, elliptical but with an acuminate "hooded" apex, about 2 mm. long, 0.9 mm. broad, sparsely pilose with a few glandular hairs on the outer surface, glabrous on the inner surface, not ciliate, deciduous; filaments alate, longer than the sepals, anthers oblong, 1 mm. long, 0.7 broad; stigmas 3, styles 3, disk 1 mm. broad, very thin, and scarcely lobed; fruit 3.5 mm. long,

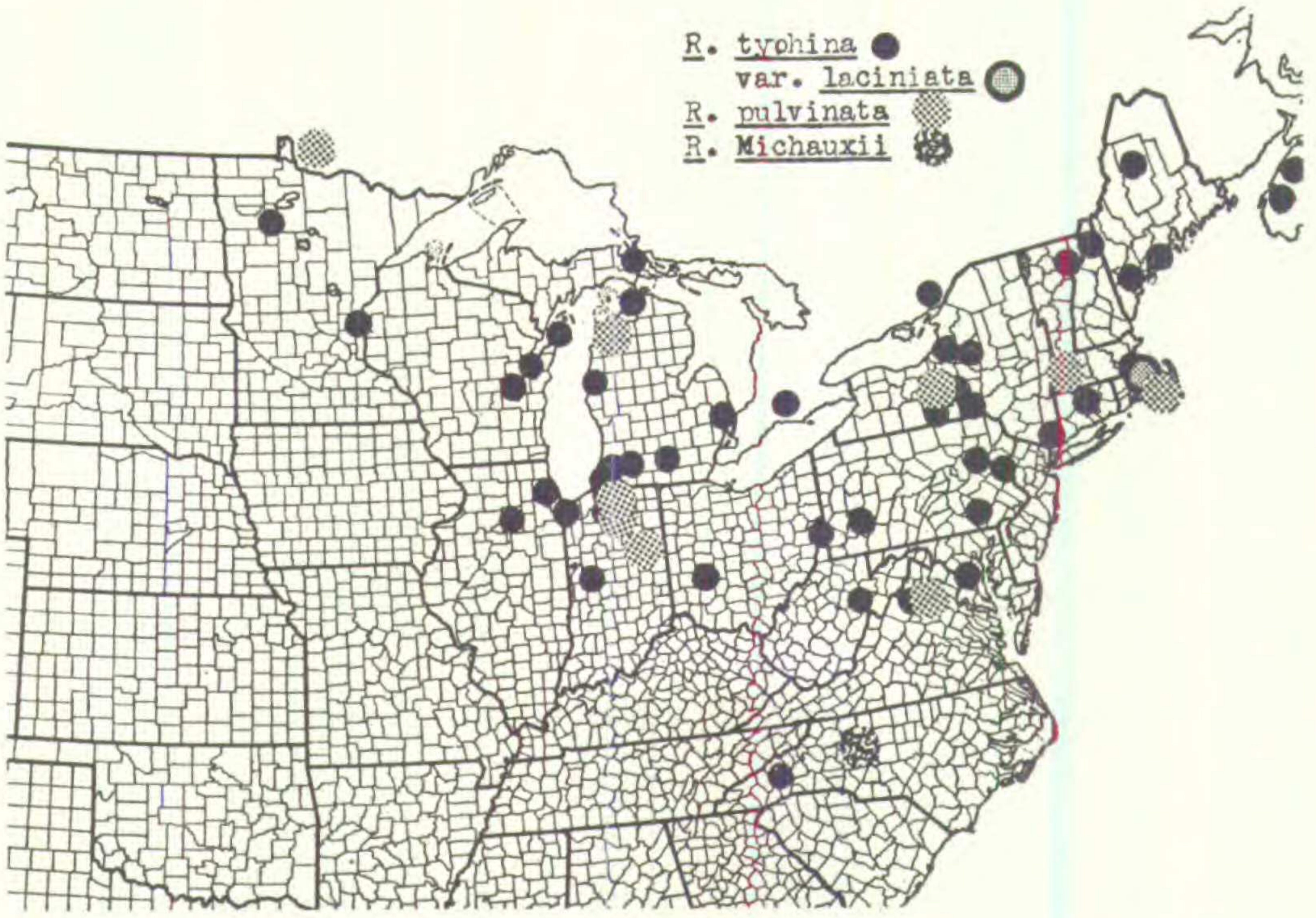

Fig. 8. The geographic distribution of *Rhus typhina* Torn., *R. typhina* var. *laciniata* Wood, *R. pulvinata* Greene, and *R. Michauxii* Sarg.

4 mm. broad, somewhat flattened, red, covered with dense layer of red hairs; seed 2 mm. long, 1.5 mm. broad, smooth in outline.

Rhus Michauxii is a very distinct species whose closest affinities seem to be with *R. javanica* L. and *R. Coriaria* L. of Asia and Europe. It is a very low, but stout, shrub, puberulent throughout, with the rachi winged near the apex of the leaves. It is endemic to a small area in North Carolina (fig. 8).

UNITED STATES:

NORTH CAROLINA: middle North Carolina, *Ashe* (M); on dry hill, Davie Co., July 7, 1895, *Ashe 239* (M); Farmington, Aug. 27, 1895, *ex Biltmore Herb.* (F, M), July 1 and Aug. 27, 1896, *872* (F); open woods, abandoned fields, roadsides, etc., Farmington, July 2 and Aug. 31, 1897, *ex Biltmore Herb. 872b* (M).

4. **Rhus typhina** Torner, Cent. Pl. II, p. 14. 1756; Torner in L., Amoen. Acad. **4**: 311. 1760; L., Sp. Pl., ed. 2. p. 38. 1762.

Rhus typhina var. *arborescens* Willd., Enum. Pl. Hort. Berol., pt. 1, p. 323. 1809.

R. typhina var. *frutescens* Willd., *ibid.*

R. typhina var. *viridiflora* Engler in DC., Monogr. Phaner. **4**: 378. 1883.

R. typhium Crantz, Inst. Herb. **2**: 275. 1766.

R. Carolinianum Miller, Gard. Dict., ed. 8. 1768.

R. viridiflora Duhamel, Arb., ed. nov., **2**: 163. 1804; Poir., Encyc. Meth. [Dict.] **7**: 504. 1806.

R. vididiflora var. *canadense* Poir., *ibid.*

R. canadensis Hort. ex Engler in DC., Monogr. Phaner. **4**: 377. 1883, non Miller, Gard. Dict., ed. 8. 1768, nec Marsh., Arbust. Am., p. 129. 1785.

R. gracilis Hort., ex Engler in DC., *ibid.*

R. hirta Sudw., Bull. Torr. Bot. Club **19**: 81. 1892, non Harv., ex Engler in DC., Monogr. Phaner. **4**: 425. 1883.

R. hirta var. *typhina* Farwell, Rept. Mich. Acad. Sci. **15**: 180. 1913.

R. frutescens Hort. ex Handlist Trees Kew, pt. 1, p. 103. 1894.

R. hirta L. ex Small, Fl. Southeast. U. S., p. 1334. 1903.

Datisca hirta L., Sp. Pl. **2**: 1037. 1753.

Schmaltzia hirta Small, Fl. Southeast. U. S., pp. 729, 1334. 1903.

Toxicodendron typhinum Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891.

A small tree with stout branches; branches villous, buds tan, lanuginose; leaves compound; leaflets 9–27, lanceolate to lanceolate-elliptic, thin, subrevolute, margin serrate, green and almost shining above, lighter and more or less glaucous below, lateral leaflets sessile, 6–13 cm. long, 1.2–3.5 cm. broad, apex acuminate, base blunt, slightly unequal, terminal leaflets long-petiolulate, 3.5–9 cm. long, 1–4.5 cm. broad, apex acuminate or subacuminate, base subcordate; terminal petiolule about 1.5 cm. long, rachis segments about 0.7–1.5 cm. long, hirsute, petioles 6–10 cm. long, villous, stout; inflorescence a terminal thyrsus about 8 cm. long, 4 cm. broad, bracts linear-lanceolate, 1.5 mm. long, 0.5 mm. broad, pointed at the apex, villous on the outer surface and with long simple hairs on the inner surface, ciliate with simple hairs, deciduous; flowers many, each flower subtended by a single bract, pedicels 1.2 mm. long; sepals deltoid, 1.5 mm. long, 0.5 mm. broad, pilose on the outer surface, glabrous on the inner, ciliate with simple hairs, persistent; petals whitish in the dried state, oblanceolate, "hooded" at the apex, about 3.5 mm. long, 1.5 mm. broad, pilose, not ciliate, deciduous; filaments much longer than the sepals, anthers rectangular, 1.5 mm. long, 0.8 mm. broad; stigmas 3, styles 3; fruit 4 mm. long and 4.5 mm. broad, somewhat flattened, red, covered with a dense layer of long red hairs; seed 2.7 mm. long, 2 mm. broad, smooth, only slightly larger at one end.

This species of northeastern North America has much the same series of variations that are found in *Rhus glabra* L. It is most easily distinguished from *Rhus glabra* by the long and dense pilosity of the stems and petioles, and the very long deeply colored red hairs on the fruit-coat. Like *Rhus glabra* it has a bipinnate variety (see below).

Distribution: Nova Scotia to North Carolina, west to Minnesota and Iowa (fig. 8).

CANADA:

NOVA SCOTIA: Mossman's near Bridgewater, Aug. 3, 1910, *Greene* (ND); woods above Eller's house, Aug. 14, 1910, *Greene* (ND); near Hartville, Aug. 15, 1910, *Greene* (ND); La Have River, Aug. 3, 1910, *Macoun 81288* (F).

ONTARIO: Kingston Mills, July 2, 1894, *Ford* (F); Port Stanley, Aug. 26, 1910, *Greene* (ND).

UNITED STATES:

MAINE: Otisfield, July 1849, *Blake* (F); North Deering, July 29, 1910, *Greene* (ND); Bristol, Aug. 3, 1898, *Chamberlain* (ND); Monhegan Island, Aug. 10, 1921, *Churchill* (M); valley of the Piscataquis River, June 27, and Aug. 7, 1895, *Fernald 242* (in part) (ND).

NEW HAMPSHIRE: Shelburne, July 1884, *Lamb* (F).

VERMONT: Peacham, Aug. 6, 1885, *Blanchard*, and July 20, 1892 (F).

MASSACHUSETTS: West Quincy, April 20, 1896, *Churchill* (M); Quincy, Oct. 26, 1901, *Murdoch 1056* (F); Plymouth, Aug. 1922, *Dunhan* (F); Dorchester, July 16, 1882, *Churchill*, Aug. 10, 1885, and June 28, 1896 (M).

CONNECTICUT: Southington, June 25, 1897, *Bissell 40*, and July 16, 1897, *467* (M).

NEW YORK: Binghamton, *Millspaugh* (F); Chemung Co., July 7, 1895 and June 11, 1896, *Lucy (Heller 7785)* (F); Utica, July 8, 1874, *Hunt* (F); Fulton, July 12, 1888, *Rowlee* (M); Oswego, July and Sept., *Wibbe* (ND); between Ringwood and Ellis Hollow, July 18, 1917, *Gershoy 8419* (M); vicinity of Oscawana Lake, Aug. 21, 1931, *Wilson* (NY).

PENNSYLVANIA: Smithville Swamp, June 17, 1887, *Small* (F); Beach Haven, June 23, 1889, *Heller* (F); Mount Alton, 1909, *Illick* (M); Bethlehem, *Kreut 186* (F); Westmoreland Co., June 23, 1876, *Pierron* (F).

MARYLAND: High Island, July 21, 1905, *Greene* (ND); canal near High Island, July 21, 1905, *Greene* (ND).

DISTRICT OF COLUMBIA: near Georgetown, July 3, 1906, *Greene*, and July 16, 1914, and July 20, 1914 (ND); Potomac valley above Chain Bride, Oct. 9, 1910, *Greene* (ND); Brookland, Sept. 3, 1911, *Nieuwland 9171a*, and *9171b* (ND).

VIRGINIA: Stony Man Mountain and vicinity, near Luray, alt. 3600 ft., Aug. 25, 1901, *Steele 5* (M).

NORTH CAROLINA: in cultivation at Biltmore, Sept. 1896, *ex Biltmore Herb. 870*, and Aug. 30, 1897, *870a* (M).

WEST VIRGINIA: Wheeling, June and July, 1878, *Guttenberg 442* (F); Pickens, June 24, 1908, *Smith 1376* (F).

MICHIGAN: Bankson Lake, southern Michigan, July 15, 1909, *Nieuwland* (M), and Aug. 8, 1915 (ND); Harbert, Sept. 3, 1914, *Johnson 1098* (F); Douglas Lake, July 12, 1919, *Deam 28718* (Deam); Dune Mound, French Lake, July 7, 1930, *Hermann 2216* (F); Schoolcraft, June 3, 1903, *Burgess 24* (F); Mackinac Island, July 28–29, *Millspaugh 141* (F); Mason Co., July 15, 1910, *Chaney 152* (F); lakes at Lawton, 1909, *Nieuwland 2337*, and *9466* (ND); Lawton, 1910, *Nieuwland 9497* (ND).

INDIANA: Clarke, June 4, 1900, *Lansing 894* (F); Pine, Aug. 4, 1896, *Umbach* (F); Clarke, June 30, 1897, *Umbach* (F); near Syracuse, June 18, 1929, *Deam 46970* (Deam); East Chicago, June 19, 1900, *Bebb 326* (F); Culver, east of Lake Maxinkuckee, Aug. 18, 1906, *Clark*, and Sept. 18, 1906 (ND); Lake Maxinkuckee, Sept. 1906, *Clark* (ND); Sugar Creek just east of Deer's Mill, July 19, 1915, *Deam 17576* (Deam); Notre Dame, 1907, *Nieuwland 93* (ND); 4 miles south of Granger, on Big Four Railroad, June 23, 1909, *Nieuwland 41* (ND); St. Mary's, July 7, 1909, *Nieuwland 93* (ND); ice-house at Notre Dame University, Sept. 24, 1909, *Nieuwland 375* (ND); South Bend, Aug. 6, 1913, *Nieuwland 11635* (ND); Mishawaka, July 1891, *E. B. U.* (F); Clear Lake, July 4, 1904, *Deam* (M).

WISCONSIN: Brown Co., June 20, 1886, *Schuette* (F); Door Co., June 29, 1919, *Millspaugh 4322* (F); Madison, June 5, 1925, *Palmer 27598* (M); Neenah, June 16, 1890, *Schuette* (F).

ILLINOIS: near Lincoln Park, Chicago, July 3, 1877, *Bross* (F); near Ravenswood, 1887, *Lloyd* (F); East Dubuque, June 12, 1925, *Palmer 27863* (M); Starved Rock, Sept. 7 and 8, 1914, *Lansing 3885* (F); La Salle Co., Sept. 1921, *Thone 302* (F).

MINNESOTA: Chidagule, June 1891, *Sandberg* (ND); Chisago City, June 1890, *Sandberg* (M); Schoolcraft Island, July 30, 1929, *Grant 2977* (M).

OHIO: John Bryan State Park, Yellow Springs, Sept. 10, 1935, *Demaree 11670* (M).

IOWA: McGregor, Aug. 15, 1925, *Pammel 585*, and Aug. 18, 1925, *1195* (M); northwest of Luxemburg, June 10, 1933, *Shimek* (M); Armstrong, Sept. 7, 1882, *Cratty* (M).

4a. Rhus typhina Torner var. **laciniata** Wood, Class-book Bot., ed. 2. p. 284. 1877; Hort. (Manning) ex Rehder, Deutsch Gärt.-Zeit. **15**: 211. 1900; Hort. ex Cowell in Bailey, Cycl. Am. Hort. **4**: 1530. 1902.

Rhus typhina forma *dissecta* Rehder, Rhodora **9**: 115. 1907.

R. typhina var. *filicina* Sprenger, Mitt. Deutsch Dendr. Ges. for 1907, p. 67. 1907.

R. typhina var. *filicifolia* Sprenger ex Demcker, *ibid.*, for 1909, p. 325. 1909.

R. filicifolia Demcker, *ibid.*

R. hirta var. *laciniata* Schneid., Illustr. Handb. Laubholzk. **2**: 154. 1907, excl. syn. *Rhus viridiflora* Poir.

R. hirta var. *dissecta* Nash, Addisonia **1**: 73. 1916.

A stout-branched, densely pubescent shrub; leaves bipinnately compound, pinnae 19–29, each with 1–7 leaflets, lateral leaflets laciniate, 3–5 cm. long, 0.2–0.5 cm. broad, undulate to laciniate, the terminal large, deltoid, laciniate; petiole and rachis very stout.

UNITED STATES:

MASSACHUSETTS: Plymouth, Aug. 1922, *Dunham* (F).

INDIANA: cultivated, Notre Dame, Sept. 5, 1912, *Nieuwland 10380* (M); cultivated, St. Mary's, Notre Dame, Oct. 9, 1912, *Nieuwland 10348*, and *1920* (ND).

MISSOURI: cultivated, Missouri Botanical Garden, Aug. 27, 1904 (M); cultivated, St. Louis, July 29, 1910, *Sherff* (F); west of Skinker Road, near Forest Park, St. Louis Co., July 5, 1913, *Drushel* (M).

5. Rhus pulvinata Greene in Fedde, Rep. Spec. Nov. **5**: 45. 1908.

Rhus americana Hort. ex Dippel, Handb. Laubholzk. **2**: 367. 1892, non Sudw., Bull. Torr. Bot. Club **19**: 80. 1892.

R. glabra × *typhina* Koehne, Deutsche Dendrol., p. 359. 1893.

R. gymnoclada Greene in Fedde, Rep. Spec. Nov. **5**: 45. 1908.

R. hybrida Rehder, Mitt. Deutsch. Dendrol. Ges. for 1913, p. 256. 1913.

A stout-branched shrub or small tree; branches puberulent, peduncle and branches of the inflorescence hirsute; leaves compound; leaflets 15–21, lanceolate, thin, subrevolute, margin serrate-dentate, green above, somewhat lighter and glaucous below, lateral leaflets sessile, 5–10 cm. long, 1.5–2.5 cm. broad, apex acuminate to subacuminate, base obtuse, terminal leaflets about 7 cm. long, 2.5 cm. broad, acuminate at apex, obtuse at base; terminal petiolule 0.2–1 cm. long, rachis segments about 2.5 cm. long, petioles 6–10 cm. long; inflorescence a terminal thyrsus about 10 cm. long, 5 cm. broad; fruit 3.5 mm. long, 3 mm. broad, somewhat flattened, red, covered with a dense layer of long red hairs; seed 2.5 mm. long, 2.2 mm. broad, smooth, slightly larger at one end.

In many respects this plant is intermediate between *Rhus glabra* and *R. typhina,* having glabrous leaves, puberulent petioles, puberulent to glabrate stems, and red, long-pilose fruit. However, until its hybrid origin is demonstrated, it seems best to treat it as a species.

Distribution: Massachusetts to Virginia, west to Ontario and Indiana (fig. 8).

CANADA:

ONTARIO: Strathroy, Aug. 21, 1910, *Greene*, Aug. 22, 1910, and June 12, 1913 (ND).

UNITED STATES:

MASSACHUSETTS: Sheffield, Aug. 2, 1920, *Churchill* (M); Uncatena Island, Aug. 10, 1927, *Fogg* (M).

NEW YORK: Mount Olivet Cemetery, Ithaca, Nov. 5, 1922, *Muenscher 14821* (M).

VIRGINIA: Stony Man Mountain in the Blue Ridge, near Luray, 1901, *Steele,* and Sept. 2, 1901 (US **type**, M photo.).

MICHIGAN: Sleeping Bear Dune, July 27, 1929, *Gates 15866* (F, US).

INDIANA: near Rochester, Aug. 2, 1923, *Deam 39245* (Deam); road to Red Mill, Aug. 6, 1909, *Nieuwland 2426* (ND); south of South Bend, 1910, *Nieuwland 9467* (ND); Studebaker's woods, South Bend, Sept. 16, 1911, *Nieuwland 1819,* and Sept. 25, 1913, *11638* (ND); Lake Maxinkuckee, Sept. 15, 1906, *Clark* (ND type of *R. gymnoclada,* M photo.).

6. **Rhus glabra** L., Sp. Pl. **1**: 265. 1753.

Rhus glabrum var. *canadense* Marsh., Arbust. Am., p. 129. 1785.
R. glabrum var. *carolinense* Marsh., *ibid.*
R. glabra var. *coccinea* DC., Prodr. **2**: 67. 1825.
R. glabra var. *dioica* DC., *ibid.*
R. glabra var. *hermaphrodita* DC., *ibid.*
R. glabra var. *occidentalis* Torr., Bot. Wilkes' Exped., p. 257. 1862–1874.
R. glabra var. *elegans* Engler in DC., Monogr. Phaner. **4**: 377. 1883.
R. glabra var. *cismontana* Cockerell in Daniels, Fl. Boulder, Colo., p. 167. 1911.
R. Canadense Miller, Gard. Dict., ed. 8. 1768; Poir., Encyc. Meth. **7**: 504. 1806.
R. elegans Ait., Hort. Kew. **1**: 366. 1789.
R. elegans var. *glauca* Demcker, Mitt. Deutsch. Dendr. Ges. for 1909, p. 325, 327. 1909.
R. elegans var. *superba* Demcker, *ibid.*
R. hypselodendrum Moench, Meth., p. 73. 1794.
R. laevicaulis Torr. ex Gray, Mem. Am. Acad. **4**: 28. 1849.
R. sanguinea Hort. ex Lavallée, Arb. Segrez., p. 53. 1877, nomen., ex Dippel, Handb. Laubholzk. **2**: 367. 1892.
R. viridiflora Hort. ex Engler in DC., Monogr. Phaner. **4**: 376. 1883, non Poir.
R. coccinea Hort. ex Dippel, Handb. Laubholzk. **2**: 367. 1892.
R. carolinense Marsh. ex Hook. & Jacks., Ind. Kew. **2**: 713. 1895.
R. macrothyrsa Goodding, Bot. Gaz. **37**: 56. 1904.
R. occidentalis Blankinship, Mont. Agr. Coll. Sci. Stud. **1**: 86. 1905; Greene, Proc. Wash. Acad. Sci. **8**: 193. 1906.
R. albida Greene, *ibid.* 194.

R. aprica Greene, *ibid.* 193.
R. arbuscula Greene, *ibid.* 184.
R. arguta Greene, *ibid.* 192.
R. asplenifolia Greene, *ibid.* 196.
R. atrovirens Greene, *ibid.* 182.
R. auriculata Greene, *ibid.* 178.
R. cismontana Greene, *ibid.* 189.
R. elegantula Greene, *ibid.* 195.
R. ithacensis Greene, *ibid.* 178.
R. longula Greene, *ibid.* 186.
R. ludoviciana Greene, *ibid.* 183.
R. media Greene, *ibid.* 188.
R. nitens Greene, *ibid.* 190.
R. oreophila Greene, *ibid.* 177.
R. petiolata Greene, *ibid.* 185.
R. pulchella Greene, *ibid.* 182.
R. pyramidata Greene, *ibid.* 180.
R. sambucina Greene, *ibid.* 190.
R. sorbifolia Greene, *ibid.* 195.
R. tessellata Greene, *ibid.* 191.
R. valida Greene, *ibid.* 185.
R. calophylla Greene in Fedde, Rep. Spec. Nov. **5**: 45. 1908.
R. angustiarum Lunell, Am. Midl. Nat. **3**: 144. 1913.
R. Hapemanii Lunell, *ibid.* 147.
Schmaltzia glabra Small, Fl. Southeast. U. S., pp. 729, 1334. 1903.
Toxicodendron glabrum Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891.

A large shrub with stout branches; branches glabrous except those of the inflorescence sparsely to densely puberulent, older stems with scattered lenticels, often glaucous; leaflets 11–31, lanceolate to elliptic-lanceolate, thin, subrevolute and serrate or rarely subentire-margined, from deep to light green and smooth above, somewhat lighter beneath, often glaucous above and below, lateral leaflets subsessile, 6–12 cm. long, 1.5–3 cm. broad, apex acuminate, base unequal and subcordate to subcuneate, terminal leaflets long-petiolulate or sessile, 5–9.5 cm. long, about 1.5–3.5 cm. broad, apex acuminate, base rounded unless leaflet sessile, then cuneate; terminal petiolule 0–2 cm. long, rachis segments about 3 cm. long, petiolules about 1 mm. long, petioles 8–11 cm. long, thick; inflorescence a large terminal thyrsus about 14 cm. long, 7 cm. broad, bracts linear-lanceolate, 1 mm. long, 0.4 mm. broad, pointed at the apex, pubescent or glabrous on the outer surface and glabrous within, ciliate with simple hairs, deciduous; flowers many, petiolulate, each flower subtended by a single bract; sepals lanceolate, 2 mm. long, 1 mm. broad, pilose on both surfaces, very sparsely so on the outer surface, more or less ciliate with simple hairs, persistent; petals whitish in the dried state, lanceolate and curved inward at the tip, about 0.5 mm. long in the staminate flower, shorter in the pistillate flower, 1 mm. broad, short-pilose on the outer surface and long-pilose on the inner, deciduous; filaments the same length as the sepals, anthers lanceolate, 1.5 mm. long, 0.8 mm. broad in the staminate flowers; stigmas 3, styles 3; fruit 4 mm. long, about as broad, somewhat flattened, red, covered with a dense layer of short red hairs; seed 2.5–3 mm. long, 2–2.5 mm. broad, smooth, slightly larger at one end.

This widespread species is one in which much variation occurs. The color of the leaves varies from a pale to a deep green, and the glaucescence may be nearly white to almost unnoticeable. The degree of revoluteness and serration also varies considerably. The difference in leaflet number on leaves of a single plant is often as much as fourteen. From field observation and greenhouse and herbarium studies of such variations, it would seem that these variations are individual and due to ecological conditions rather than to varietal or specific segregations. However, two rather marked variations do occur (see below). In one case the variety is a stout shrub bearing bipinnate leaflets, and in the other case it is a rather slender-stemmed, small-leaved shrub, with sparse-pilose branches and with the red hairs of the fruit-coat quite different from those of the species (see pl. 13, fig. d).

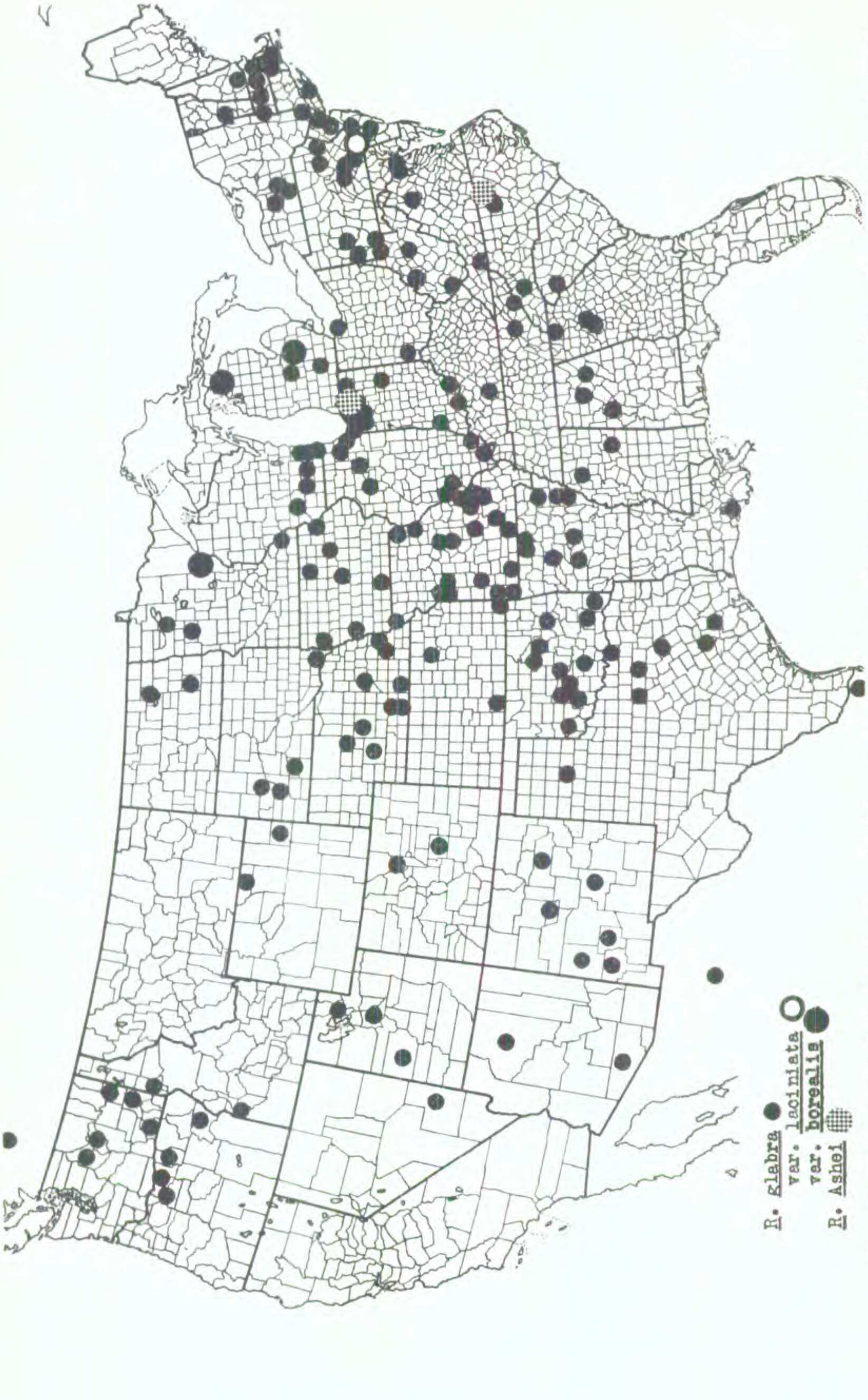
R. glabra ●
var. laciniata ○
var. borealis ●
R. Ashei ▨

Fig. 9. The geographic distribution of *Rhus glabra* L., *R. glabra* var. *laciniata* Car., *R. glabra* var. *borealis* Britt., and *R. Ashei* (Small) Greene.

Distribution: New Hampshire to Georgia west to British Columbia, eastern Washington, Oregon, and Nevada, to Tamaulipas and Chihuahua (fig. 9).

CANADA:

British Columbia: Ashcroft, June 28, 1907, *Cowles 216* (F, M).

UNITED STATES:

New Hampshire: Hillsboro, July 28, 1920, *Batchelder* (M).

Vermont: Brandon, alt. 475 ft., Sept. 9, 1922, *Dutton* (M).

Massachusetts: Barnum Street, Sheffield, July 26, 1920, *Churchill* (M); Nonquitt, Aug. 23, 1888, *Sturtevant* (M); near Water Shop Pond, Springfield, Aug. 5, 1924, *Seymour 489* (M); Southampton, *ex Chapman Herb.* (M); upper Moody Road, Dracut, July 20, 1927, *Beattie* (Okla), July 26, 1929 (M); East Framingham, Aug. 4, 1890, *Sturtevant* (M); Milton, July 29, 1888, *ex Churchill Herb.* (M); Harland Street, Milton, July 17, 1898, *Churchill* (M); Dorchester, July 30, 1882, *Churchill*, and Sept. 21, 1884 (M); Petersham, July 13, 1908, *Jack* (M).

Rhode Island: Cumberland, Sept. 13, 1903, *Greenman 1822* (M).

New York: Jerome Park, New York, Oct. 11, 1930, *Wilson* (NY); Chemung Co., July 8, 1896, *Lucy 7784* (F); Cold Spring Harbor, Aug. 24, 1903, *Whitford 62* (F); near Cornell University boathouse, Ithaca, July 7, 1913, *Palmer & Wiegand 765* (M); Ithaca, July 22, 1878, *Trelease* (M); Fall Creek, Ithaca, July 17 and Sept. 1893, *Wiegand* (US type of *R. ithacensis)*; near Lake Waccabuc, Aug. 12, 1894, *Pollard* (US type of *R. pyramidata)*; Yonkers, Nov. 2, 1930, *Wilson* (NY); Penn Yan, *Sartwell* (M).

New Jersey: Alpine, Oct. 8, 1932, *Wilson & Alexander* (NY); .75 mile northwest of Shiloh, July 24, 1927, *Adams 851* (M); Watchung, July 5, 1930, *Moldenke 1321* (M), July 27, 1931, *6058* (NY).

Pennsylvania: 1907, *Jennings* (ND); Pittsburgh, Aug. 2, 1907, *Jennings* (ND); Kittanning, Aug. 16, 1906, *Jennings* (ND); mountains north of Harrisburg, July 12, 1888, *Small* (M); Ohiopyle, alt. 2000 ft., Sept. 2, 1907, *Jennings* (ND); Deep Valley, Aug. 9, 1907, *Jennings* (ND); Mountville, Aug. 1895, *Eby* (M); near Georgetown, July 28, 1890, *Small* (F); Penryn Park, Sept. 18, 1893, *Eby* (M); Beach Haven, June 29, 1889, *Heller* (F); Mount Alton, 1900, *Illick* (M); Pocono Plateau, July–Aug. 1904, *Harshberger* (M); Schuylkill Park, Philadelphia, July 5, 1869, *Redfield 1164* (M).

Maryland: canal opposite High Island, July 21, 1905, *Greene* (ND); College Park, *Steward* (M).

District of Columbia: Washington, *Blanchard*, and July 14, 1891 (M); M Street road N. E., Washington, Oct. 12, 1892, *Blanchard*, in part (M); banks of the Potomac near Georgetown, July 3, 1906, *Greene* (ND); Rock Creek Park, Aug. 15, 1906, *Greene* (ND); Congress Heights, Aug. 16, 1906, *Greene* (ND); banks of Potomac, Aug. 16, 1906, *Greene* (ND); site of old Pennsylvania Railway Station, Sept. 20, 1909, *Greene* (ND); Brookland, July 27, 1910, *Holm* (M); Brookland, July 3, 1900, *Nieuwland 627*, June 27, 1910, *610* (ND); High Island chain bridge, July 13, 1910, *Nieuwland 648* (ND); Brookland, July 5, 1911, *Nieuwland 1637* (ND), July 30, 1911 (M), Sept. 5, 1911, *1637*, and 1912, *1637* (ND).

Virginia: near Luray, alt. 3400 ft., Aug. 30, 1901, *Steele 177* (M); south fork of the Holston River at St. Clair Bottom, alt. 2200 ft., July 30, 1892, *Small* (M).

North Carolina: Lake Junaluska below Mission Inn, July 8, 1936, *Noell 105* (M); Biltmore, July 10 and Sept. 1, 1896, *ex Biltmore Herb. 1378* (M), July 10 and Sept. 28, 1897, *1378b* (F, M); Chapel Hill, *Ashe* (US type of *R. oreophila)*.

SOUTH CAROLINA: Anderson, July 14, 1919, *Davis* (M).

GEORGIA: between Gray and Macon, June 1, 1928, *Gillespie 4894* (ND); Stone Mountain, July 12, 1902, *Smith 2396* (F); Blue Ridge Mts., Aug. 11, 1909, *Smith 2627* (F); Yellow River, July 27, 1897, *Eggert* (M); Yellow River near McGuire's mills, alt. 750 ft., July 11, 1893, *Small* (F, US type of *R. pulchella).*

ALABAMA: June 18, 1897, *Eggert* (M); Gadsden, 1888, *McCarthy* (US type of *R. atrovirens);* bank of Warrior River, between Riverview and Holt, Oct. 24, 1908, *Harper 135* (M).

MISSISSIPPI: Agricultural College, Aug. 11–17, 1896, *Pollard 1261* (F, M, cotypes of *R. auriculata);* near Batesville, Sept. 17, 1896, *Eggert* (M).

LOUISIANA: Cote Blanche, Oct. 10, 1882, *Langlois* (ND type of *R. ludoviciana,* M photo.).

OHIO: Oxford, July 9, 1910, *Overholts* (M); Oak Harbor, Aug. 1927, *Moore* (Okla).

WEST VIRGINIA: near Ripley, June 27, 1930, *Berkley 846* (M); near Varney School, July 7, 1930, *Berkley 986* (M); near Buckhannon, July 17, 1895, *Pollock* and July 17, 1896 (M).

MICHIGAN: region of Douglas Lake, June 27, 1928, *Hanna 404* (M); Jackson Co., Sept. 19, 1898, *Camp* (F type of *R. media,* M photo.); Lawton, 1909, *Nieuwland 2425* (ND); Lake Michigan, Lawton, July 19, 1909, *Nieuwland* (M).

INDIANA: Lost Lake, Aug. 18, 1906, *Clark* (ND type of *R. arbuscula);* Chaw Lake, July 2, 1912, *Nieuwland* (M); near Hartford City, June 25, 1905, *Deam,* July 9, 1910, *7030,* and *7034* (Deam); Clark Co., July 30, 1909, *Deam 5421* (ND); Stone Lake, July 7, 1920, *Deam 31347* (Deam); New Albany, July 31, 1911, *Deam 9358* (Deam); Medaryville, July 14, 1920, *Deam 31736* (Deam); Decker, April 20, 1911, *Deam 7872* (Deam); near Howe, Aug. 29, 1914, *Deam 14956* (Deam); Miller, July 6, 1912, *Nieuwland* (M); north of Hudson Lake, Aug. 17, 1912, *Nieuwland 10416* (ND); near Culver, July 2, 1911, *Deam 8990, 8991* (Deam, ND), Aug. 31, 1914, *15082,* Aug. 19, 1915, *17945,* and June 30, 1921, *34379* (Deam); 8 miles northeast of Cannelton, Oct. 2, 1920, *Deam 33348* (Deam); Mineral Springs, *Nieuwland 11741* (ND); near Pulaski, June 7, 1924, *Deam 40565* (Deam); Notre Dame, *Nieuwland 627,* 1909, *9077* (ND); ice-house, Notre Dame, July 5, 1909, *Nieuwland 5* (M, ND), *5a* (ND); Notre Dame, 1910, *Nieuwland 9468,* Sept. 17, 1910, *676* (ND); road from Carter's Field, Notre Dame, June 23, 1913, *Nieuwland 11270* (ND); road from ice-house to Carter's Field, Notre Dame, Sept. 10, 1913, *Nieuwland 11507* (M, ND); Wells Co., July 25, 1897, *Deam* (F).

KENTUCKY: Bowling Green, Aug. 23, 1899, *Price* (M).

TENNESSEE: Charlotte Pike, June 10, 1881, *Gattinger* (M); within 3 miles of Wolf Creek Station, Sept. 14, 1897, *Kearney 639* (M, ND); near Green River, Knoxville, July 1898, *Ruth 835* (M).

WISCONSIN: Waupaca, 1907, *Garische* (M); Dane Co., 1862, *Greene* (ND); Madison, June, 5, 1925, *Palmer 27599* (M); Jefferson Junction, July 10, 1903, *Eggert* (M); Fox River, July 25, 1907, *Gates & Sleeper 1815* (F); near Milwaukee, Aug. 1906, *Ogden* (ND); Rochester, July 24, 1907, *Gates & Sleeper 1811* (F); .5 mile east of Richland Center, June 7, 1912, *Lansing 3430* (F).

ILLINOIS: Riverside, July 6, 1878, *Bross* (F); Leyden, *Gates 746* (F); Riverside, July 21, 1876, *Grassly* (F); West Pullman, Sept. 8, 1900, *Lansing 1111* (F); Thornton, June 18, 1902, *Lansing 1335* (F); Hinsdale, Sept. 12, 1902, *Smith 577* (F type of *R. valida,* M photo.); Shawneetown, June 19, 1919, *Palmer 15491* (M);

Illinois State Park, Starved Rock, June–Sept. 1921, *Thone 185* (M); Golconda, Oct. 8, 1919, *Palmer 17008* (M); near Wady Petra, June 30, 1897, *Chase 57* (M), Aug. 7, 1897, *80* (M).

MINNESOTA: Delnoit, July 15, 1912, *Chandonnet* (M); Squaw Lake, July 22, 1932, *Buell 489* (M); Spicer, Aug. 1892, *Frost* (F, M); Stockton Bluffs, Aug. 23, 1888, *Holzinger* (US type of *R. longula).*

IOWA: Cedar River region, July 8, 1929, *Burk 638* (M); Buffalo Slough, Mason City, Aug. 31, 1927, *Shimek* (M); Edgewood, May 31, 1923, *Shimek* (M); Decatur Co., June 13, 1896, *Fitzpatrick* (F); Missouri Valley, Harrison Co., Aug. 13, 1908, *Shimek* (M); Blairs Bridge, July 5, 1925, *Shimek* (M); near Joy Creek, 7 miles southeast of Westfield, June 4, 1926, *Shimek,* and May 25, 1929 (M); Ames, *Hitchcock* (M).

MISSOURI: near Watson, Sept. 3, 1920, *Palmer 18961* (M); Columbia, May 20, 1876, *Tracy* (M); Cass Co., June 1865, *ex Broadhead Herb.* (M); Bear Creek, north of Bearcreek, July 16, 1934, *Steyermark 13351* (M); Dumas, July 27, 1923, *Bush 10113* (M); Jefferson City, June 1867, *Krause* (M); Willow Springs, July 8, 1914, *Palmer 6222* (M); Pilot Knob, June 7, 1888, *Pammel* (M); Des Arc, Nov. 22, 1907, *Smith 45* (F); Independence, June 17, 1895, *Bush 147* (M); Courtney, July 1, 1934, *Bush* (M, ND); Webb City, June 16, 1901, *Palmer 75,* and June 14, 1903, *16* (M); Joplin, Oct. 13, 1907, *Palmer 1128,* and July 4, 1918, *14297* (M); near Joplin, June 18, 1923, *Palmer 23355* (M); 5 miles southeast of Catawissa, June 22, 1929, *Steyermark 1105* (M); Columbus, June 21, 1930, *Palmer 36630* (M); Noel, Sept. 7, 1913, *Palmer 4167* (M); Riverview Park, Hannibal, Aug. 28, 1911, *Davis 722* (M); Hannibal, Aug. 22, 1912, *Davis 3898* (M); Ely Street, Hannibal, June 9, 1915, *Davis 4407* (M); Jerome, June 2, 1914, *Kellogg 311* (M); Bismarck, June 25, 1920, *Palmer 18071* (M); Hall's Ferry Road, St. Louis Co., June 29, 1893, *ex Glatfelter Herb.* (M); St. Louis Co., July 25, 1936, *Barkley 1084* (M); Forest Park, St. Louis, *Eggert,* and June 24–29, 1875 (M); Bach's Crossing, Meramec Highlands, June 26, 1910, *Craig* (M); St. Louis County, June 13, 1876, *Eggert* (M); Jefferson Barracks, June 17, 1890, *Hitchcock* (M); Allenton, Aug. 30, 1884, *Kellogg* (M); Old Orchard, Oct. 1886, *Pammel* (M); 3 miles west of Valley Park, Sept. 18, 1929, *Steyermark 1139* (M); Creve Coeur, June 14, 1885, *Wislizenus 56* (M); campus, Washington University, July 7, 1926, *Woodson 563* (M); Montier, June 30, 1894, *Bush 139* (M); Galena, May 27, 1914, *Palmer 5776* (M); James Fork of the White River, June 1, 1914, *Palmer 5821* (M); Washington Co., July 1, 1928, *Kellogg 1853* (M).

ARKANSAS: Cotter, June 16, 1914, *Palmer 6011,* and Sept. 1, 1915, *8410* (M); Decatur, *Plank* (M); Jonesboro, June 29, 1929, *Demaree 6958* (M); near Hot Springs, June 4, 1923, *Palmer 23044* (M); Marianna, June 21, 1935, *Griffin & Demaree 43* (M); Rush, June 18, 1914, *Palmer 6025* (M); near Nogo, Aug. 15, 1932, *Merrill 2* (M); Pulaski Heights, Little Rock, Sept. 30, 1931, *Demaree 8335* (M); Wheatley, Sept. 1, 1934, *Demaree 10906* (M).

NORTH DAKOTA: Kathryn, July 28, 1911, *Bergman* (Okla); Devils Lake, Narrows, June 26, 1913, *Lunell 701* (Minn type of *R. angustiarum,* M photo.); Devils Lake, June 26, 1913, *Lunell* (ND); Devils Lake, Narrows, Aug. 12, 1913, *Lunell* (Deam, M, US), July 13, 1914 (Deam); Devils Lake, July 4, 1930, *Palmer 36892* (M).

SOUTH DAKOTA: Spearfish Canyon, Aug. 2, 1926, *Hayward 203* (F); Vermilion, June 29, 1910, *Visher 4134* (M); 2 miles northwest of Sturgis, Aug. 30, 1911, *Carr 95* (M); Piedmont, June & Aug., 1895, *Pratt* (F type of *R. sambucina*, M photo.); Johnson's mill, Rapid Creek, Black Hills National Forest, alt. 4300 ft., July 15, 1910, *Murdock 4256* (F); near Piedmont, *Palmer 37018* (F, M), June 28, 1929, *37617* (M); Black Pipe Creek, Aug. 22, 1911, *Visher 2277* (F).

NEBRASKA: Platte River, Louisville, June 18, 1934, *Morrison 1094* (M); Anselmo, July 6, 1889, *Webber* (M); Franklin, 1893, *Laybourne* (M); Minden, July 15, 1907, *Hapeman* (ND), July 8, 1912 (Minn), Sept. 12, 1912, (Minn type of *R. Hapemanii*, ND), July 10, 1933, (ND), July 14, 1933 (M); Lancaster Co., June 1885, *Milligan 32* (F); Lincoln Co., July 1901, *Baker* (M); Loup River, Nance Co., July 14, 1857, *Hayden* (M); Nuckolls Co., June 21, 1898, *Hedgcock 2522* (M); near Plummer Ford, Dismal River, Aug. 24, 1893, *Rydberg 1443* (US type of *R. cismontana*).

KANSAS: Kiowa, July 1892, *Hitchcock* (M); Medicine Lodge, July 22, 1933, *Palmer 41836* (M); near Galena, June 6, 1924, *Palmer 25340* (M); Riley, June 12, 1895, *Norton 72* (M); Manhattan, Sept. 1923, *Salmon* (M).

OKLAHOMA: Caddo Co., June 30, 1903, *van Vleet 54* (Okla); 7 miles northeast of Norman, May 27, 1928, *Barkley 415* (Okla.), and 3 miles west of Norman, July 1929, *Barkley* (Okla); 2 miles west of Norman, June 25, 1924, *Bruner* (Okla); east of Norman, near Little River, June 1, 1927, *Fielder 38* (Okla); east of Norman, Oct. 17, 1926, *Little 513* (Okla); near Camp Boulder, Wichita Mountains, June 5, 1926, *Little 473* (Okla); Sapulpa, July 27, 1894, *Bush 170* (M); 4 miles east of Tuttle, June 21, 1928, *Personett 27* (Okla); 4 miles north of Reed, June 8, 1931, *Bull 187* (Okla); McCurtain Co., June 5, 1930, *Little & Olmsted 31*, and June 7, 1930, *132* (Okla); Arbuckle Mts., April 20, 1927, *Fielder* (Okla); 2 miles west of Muskogee, Aug. 5, 1926, *Little 248*, and June 15, 1927, *736* (Okla); Platt National Park, Sulphur, May 20, 1935, *Merrill & Hagen 459* (F); 12 miles south of Stillwater, July 14, 1927, *Stratton 169* (M); Stillwater, June 9, 1893, *Waugh 103* (M); north of Sacred Heart, May 21, 1932, *Barkley 196* (Okla); 8 miles northeast of Finley, June 25, 1919, *Jeffs* (Okla); Woods Co., June 1917, *Clifton 99* (Okla); near Fairvalley, June 1, 1913, *Stevens 714* (M).

TEXAS: Paloduro, Sept. 11, 1917, *Young* (M); College Station, Aug. 13, 1921, *Ferris & Duncan 3277* (M); Denison, Oct. 28, 1933, *McGregor 43* (M); Willis, *Warner* (M); Corsicana, June 1, 1915, *Palmer 7823* (M); Strawn, June 26, 1918, *Palmer 14243* (M); Polytechnic, May 10 and June 6, 1912, *Ruth 143* (M).

WYOMING: Wolf Creek, Sheridan Co., July 12, 1896, *Nelson 2303* (US type of *R. asplenifolia*, M); Beaver Creek, Weston Co., July 21, 1901, *Nelson 8456* (M).

COLORADO: alt. 6000 ft., July 20, 1895, *Cowan* (M), *95* (US type of *R. tessellata*); near Boulder, alt. 5400 ft., July 14, 1920, *Hanson C274* (M); Boulder, 1908, *Pace 311* (M); Gregorio Canyon, 6100 ft., July 16, 1906, *Daniels 221* (M); Manitou Iron Springs, 1874, *Brandegee 910* (M).

NEW MEXICO: Capelin Canyon, Sandia Mts., alt. 8100 ft., July 15, 1911, *Ellis 256* (M); Santa Fe Creek Valley, July 8, 1847, *Fendler 110* (M); Whitman's Camp, 18 miles east of Albuquerque, Sept. 7, 1895, *Mulford 1204* (M); on Mogollon Creek, Mogollon Mts., Catron Co., July 14, 1903, *Metcalfe*, and *227* (M); Santa Rita, Aug. 8, 1895, *Mulford 706* (M); White Mts., Lincoln Co., June 1936, *Hinckley 766* (F); White Mts., alt. 6400 ft., Aug. 20, 1897, *Wooton 581* (M, ND); mountains west of Las Vegas, 1881, *Vasey* (US type of *R. sorbifolia*); south end of the Black Range, Kingston, about alt. 6600 ft., June 16, 1904, *Metcalfe 998* (M).

ARIZONA: Pine Canyon, Chiricahua Mts., alt. 6500 ft., Aug. 25, 1906, *Blumer 96,* and *98* (ND), *1293* (F, M); Paradise, Aug. 26, 1906, *Blumer 98b* (US type of *R. calophylla);* Stephens' Ranch, Chiricahua Mts., alt. 5700 ft., July 8, 1907, *Blumer 1267* (M); Cochise Co., Aug. 8, 1907, *Stephens FC15* (ND); Flagstaff, July 13, 1889, *Greene* (ND); Flagstaff, Aug. 29, 1922, *Hanson A169* (M); Francisco Peaks, alt. 2300 m., Aug. 18, 1901, *Leiberg 5871* (US type of *R. albida);* near Flagstaff, alt. 7000 ft., July 18, 1898, *MacDougal 309* (F); Gila Co., Aug. 27, 1936, *Little 4286* (M, ND); Fort Apache, June 21–30, 1890, *Palmer 585* (US type of *R. elegantula);* Santa Rita Mts., Pima Co., June 24, 1882, *Pringle* (M).

IDAHO: Clarks Fork Valley, below Parma, 680 m. alt., Aug. 21, 1895, *Leiberg 1554* (M); Nez Perce Co., alt. 3500 ft., July 14, 1896, *Heller 3421* (M, ND).

UTAH: Provo State Canyon, alt. 6000 ft., 1894, *Jones 5612* (M); Beaver Mts., Millard Co., Sept. 1909, *Greene* (ND); Farmington Canyon, near Salt Lake City, July 14, 1902, *Pammel & Blackwood 3661* (M); Provo, June 16, 1902, *Goodding 1129* (M); mouth of Rock Canyon, Provo, alt. 5000 ft., May 28, 1934, *Harrison 7541* (M); Provo, alt. 6000 ft., July 10, 1894, *Jones 5612* (M, US type of *R. nitens);* Weber Co., June 1889, *Dodge 111* (M).

NEVADA: Caliente, May 29, 1902, *Goodding 988* (M, US type of *R. macrothyrsa).*

WASHINGTON: Camas Creek, Aug. 20, 1897, *Gorman 632* (US type of *R. aprica);* along Columbia River, north of Wenatchee, May 5, 1929, *Benson 1312* (M); east of Leavenworth, alt. 1100 ft., July 14, 1920, *Otis 990* (M); near Rock Island, June 15, 1931, *Thompson 6756* (M); near Old Fort Okanogan, June 8, 1841, *Pickering & Brackenridge* (Wilkes' Exped.) *927* (US type of *R. glabra* var. *occidentalis);* Spokane, Aug. 1892, *Sandberg* (M); Spokane, July 1898, *Savage, Cameron & Lenocker* (F, M); Walla Walla, July 1898, *Savage, Cameron & Lenocker* (F); Wawawai, May 1897, *Elmer 872,* July 17, 1892, *Lake* (M); Almota, July 5, 1892, *Lake & Hull* (M); Whitman Co., June 27, 1933, *Thompson 9250* (M, ND).

OREGON: Rattlesnake Spring, July 21, 1930, *Palmer 37994* (M); Ione, Sept. 1902, *Baker 122* (M); near Rhea Creek, 540 m., Sept. 11, 1894, *Leiberg 893* (M, US type of *R. arguta);* 2 miles above mouth of the John Day River, May 25, 1925, *Henderson 5199* (M); along the Seattle River, near Grant, June 30, 1887, *Howell 1108* (M, ND); along Bakeoven Creek, Maupin, Aug. 3, 1924, *Whited 1059* (ND).

MEXICO:

CHIHUAHUA: Sierra Madre, June 21–July 29, 1899, *Nelson 6002* (US); in the Sierra Madre near Colonia Garcia, alt. 7500 ft., July 20, 1899, *Townsend & Barber 154* (F, M, ND, US).

TAMAULIPAS: above Mesa de Tierra, near San José, Sierra de San Carlos, July 12, 1930, *Bartlett 10281* (US).

6a. Rhus glabra L. var. **laciniata** Carrière, Rev. Hort. for 1863, p. 7. 1863.

Rhus bipinnata Greene, Torreya **5**: 155. 1905.

R. glabra forma *laciniata* Robinson, Rhodora **10**: 35. 1908.

A stout-branched, glabrous shrub with leaves bipinnately compound, of 19–29 pinnae, each pinna with 1–11 leaflets, lateral leaflets lanceolate, 3–5 cm. long, 0.6–1 cm. broad, entire, serrate or laciniate, the terminal laciniate, petiole and rachis very stout.

UNITED STATES:

PENNSYLVANIA: near West Chester, Oct. 5, 1876, *Engelmann* (M).

DELAWARE: cultivated, Centerville, July 17, 1877, *Commons* (M).

INDIANA: cultivated, Notre Dame, Aug. 5 and Oct. 5, 1912, *Nieuwland 10380* (M, ND), 1923 (ND).

MISSOURI: cultivated, Missouri Botanical Garden, Sept. 17, 1906, *Kellogg* (M).

6b. Rhus glabra L. var. **borealis** Britton, Manual, p. 601. 1901.

Rhus glabra var. *Sandbergii* Vasey & Holz. ex Greene, Proc. Wash. Acad. Sci. **8**: 187. 1906.

R. borealis Greene, *ibid.* 188.

R. Sandbergii Greene, *ibid.*

A shrub with slender, sparsely pilose branches; leaflets few, small, serrate; fruits covered with glandular hairs about 0.5 mm. in length.

CANADA: ONTARIO: Strathroy, June 16, 1910, *Greene* (ND).

UNITED STATES:

MICHIGAN: Douglas Lake region, July 16, 1918, *Ehlers* (M); Alma, Aug. 12, 1895, *Davis* (F **type**, M photo.); Glenwood Cemetery, Flint, July 25, 1909, *Sherff* (F).

MINNESOTA: Thompson, July and Aug. 1891, *Sandberg* (F, US type of *R. Sandbergii,* M photo.).

7. Rhus Ashei (Small) Greene, Proc. Wash. Acad. Sci. **8**: 179. 1906.

Rhus caroliniana Ashe, Bot. Gaz. **20**: 548. 1895, non Miller, Gard. Dict., ed. 8. 1768.

Schmaltzia Ashei Small, Fl. Southeast. U. S., pp. 729, 1334. 1903.

Stout-branched shrub; new and old branches glabrous except for the peduncle and branches of the inflorescence which are densely villous-hirsute, buds tan, lanuginose; leaves compound; leaflets elliptic to elliptic-lanceolate, 13–23, thin, not revolute, margin serrate-dentate, dark green, glabrous, and almost shining above, somewhat lighter, glabrous, and dull but not glaucous beneath, lateral leaflets subsessile, 8–13 cm. long, 2.5–4.5 cm. broad, at apex acute to subacuminate, subcuneate to obtuse at base, terminal leaflets 7–9 cm. long, 3–4 cm. broad, acute to subacuminate at apex, obtuse at base; terminal petiolule 1.5–2 cm. long, not winged, rachis segments about 3–5 cm. long, not winged, petiolules about 1 mm. long, petioles 9–11 cm. long, stout; inflorescence a large terminal thyrsus about 18 cm. long, 12 cm. broad, bracts narrowly deltoid-lanceolate, 1.5 mm. long, 0.5 mm. broad, pointed at the apex, glabrous on both surfaces, ciliate with simple hairs, deciduous; flowers many, polygamo-dioecious, each flower subtended by a single bract, pedicels about 1.5 mm. long; sepals deltoid-lanceolate, 1.5 mm. long, 0.7 mm. broad, pilose on the outer surface, glabrous on the inner surface, ciliate with simple hairs, persistent; petals whitish in the dried state, elliptical, acuminate and inrolled at the apex, about 1.5 mm. long, 0.7 mm. broad, sparsely pilose and with a few glandular hairs on the outer surface, long-pilose on the inner surface, not ciliate, deciduous; stigmas 3, styles 3; fruit 4 mm. long and broad, somewhat flattened, red, covered with a dense layer of short red hairs; seed 2.5 mm. long, 2 mm. broad, smooth, larger at one end.

This seldom-collected species of eastern North America is obviously closely related to *Rhus glabra,* but the leaflets are coarser, much deeper green, more dentate, and are not at all glaucous. The red hairs on the fruit are longer than in *Rhus glabra,* but are of the same form in both species.

Distribution: North Carolina and Indiana (fig. 9).

UNITED STATES:

NORTH CAROLINA: Granville Co., Aug. 10, 1895, *Ashe 825* (M, ND).

INDIANA: 4 mile bridge, Notre Dame, Sept. 10, 1913, *Nieuwland 11624* (M); Studebaker's woods, South Bend, Sept. 25, 1913, *Nieuwland 11638* (M, ND).

Subgenus SCHMALTZIA (Desv.) Schneider, emend. Barkley

SCHMALTZIA Desv., Journ. de Bot. Appl. **1**: 229. 1813; DC., Prodr. **2**: 72. 1825, as *Schmalzia* in syn.; Schneid., Illustr. Handb. Laubholzk. **2**: 148. 1907, as subgenus.

Lobadium Raf., Am. Monthly Mag., p. 357. 1819.

Neostyphonia Shafer in Britt., N. Am. Trees, p. 612. 1908.

Rhoeidium Greene, Leafl. Bot. Obs. & Crit. **1**: 143. 1905.

Styphonia Nutt. ex Torr. & Gray, Fl. N. Am. **1**: 220. 1838.

Turpinia Raf., Med. Repos. N. Y. **5**: 352. 1808.

Trichocarpae Engler, Bot. Jahrb. **1**: 379. 1881, as section, in part.

Spreading shrubs, small trees, or rarely scandent plants; branches many, comparatively slender. Leaves simple, trifoliolate, or imparipinnately compound, deciduous or not. Inflorescence a compound spike, either stout and contracted or slender and diffuse. Flowers mostly polygamous, numerous, sessile or nearly so, subtended by squamaceous chartaceous or coriaceous, concave bracts, each enclosing a pair of bractlets; bracts deltoid-lanceolate or broadly ovate and pubescent on the outer surface with simple and usually with glandular hairs intermixed, commonly ciliate with simple and glandular hairs. Drupes red or orange; epicarp pubescent with simple and glandular hairs.

North America, from Canada to Costa Rica.

Type species: **Rhus aromatica** Ait., Hort. Kew. **1**: 367. 1789 (*Toxicodendron Crenatum* Miller, Gard. Dict., ed. 8. 1768).

Three elements of SCHMALTZIA have been variously proposed as generic segregates by Rafinesque, Nuttall, Greene, and others; in each case the author points out the morphological divergence from SUMAC, but mostly overlooks the similarity to the other elements of this group. Inferring from his treatment, Gray alone seems to have realized their mutual relationships.

KEY TO THE SECTIONS

Flowers usually appearing with the leaves; evergreen shrubs and trees, mostly of subtropical North America.
  Axillary inflorescences not surpassed by subtending leaves; leaves thin-coriaceous; inflorescences with many loose, slender, lateral spikes..PSEUDOSUMAC
  Axillary inflorescences surpassed by the subtending leaves; leaves coriaceous; inflorescences with few, contracted, usually lateral, stout spikes.
    Leaves mostly simple..STYPHONIA
    Leaves mostly imparipinnately compound..............PSEUDOSCHMALTZIA
Flowers usually appearing before the leaves; mostly deciduous shrubs of temperate North America.
  Spinescent shrubs with very small, 3–9-foliolate leaves; rachis winged; bracts and bracteoles approximately the same size....................RHOEIDIUM
  Gracefully diffuse or subscandent shrubs, usually with 3-foliolate leaves; rachis not winged; bracteoles much smaller than the bracts....LOBADIUM

Section PSEUDOSUMAC Barkley, n. sect.

Slender shrubs with many lax, diffuse branches, each clothed with alternate, subcoriaceous, and persistent odd-pinnate leaves; leaflets more or less pubescent, usually entire and subrevolute-margined; rachis not winged. Flowers many, white or cream-colored, in apical, laxly paniculate, compound spikes, perfect or polygamo-dioecious, sessile; each flower subtended by a subovate, subacute and persistent bract and two similar bracteoles. Drupe red, slightly broader than long; seed bony, smooth, flattened, smaller at one end.

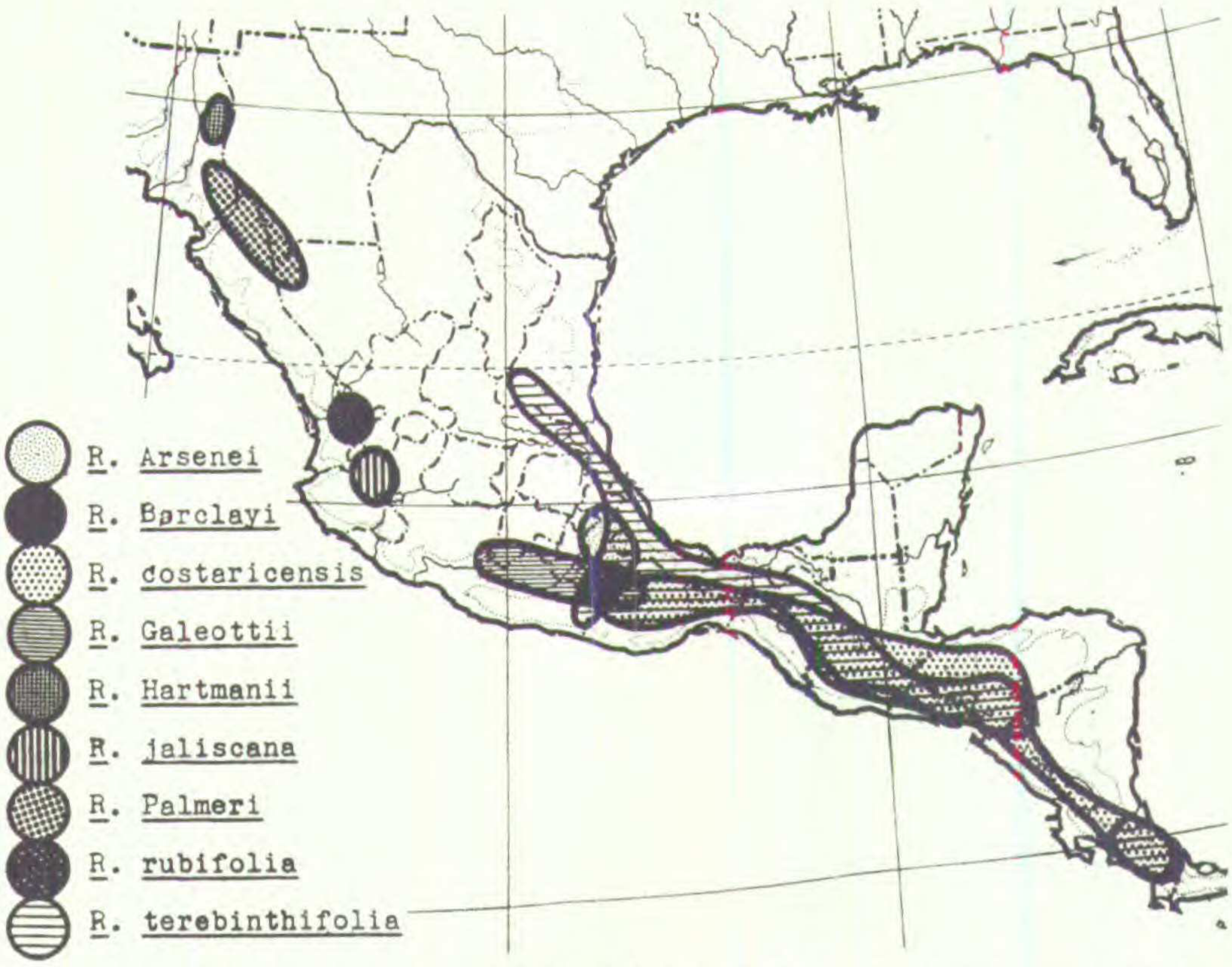
R. Arsenei
R. Barclayi
R. costaricensis
R. Galeottii
R. Hartmanii
R. jaliscana
R. Palmeri
R. rubifolia
R. terebinthifolia

Fig. 10. The geographic distribution of the species in Section PSEUDOSUMAC.

Mexico to Costa Rica (fig. 10).

Type species: **Rhus terebinthifolia** Schlecht. & Cham., Linnaea **5**: 600. 1830.

Pseudosumac is a natural assemblage of species having slender, subscandent, diffuse branches terminated by very slender, diffuse, compound spikes of very small flowers. *Rhus Hartmanii* seems to indicate a relationship between this group and PSEUDOSCHMALTZIA.

KEY TO THE SPECIES AND VARIETIES

- Leaflets of the leaves below the inflorescence small, 1–2 cm. long.
  - Leaflets mostly 9–15, petiolulate, rarely lobed.
    - Stem and leaves densely pubescent; inflorescence relatively coarse........ *8. R. Hartmanii*
    - Stem and leaves puberulent; inflorescence relatively slender....*9. R. jaliscana*
  - Leaflets mostly 3–5, sessile or subsessile, often lobed............*10. R. Arsenei*
- Leaflets of the leaves below the inflorescence relatively large, 1.5–7.5 cm. long.
  - Leaflets when mature mostly sessile or subsessile.
    - Leaflets not rugose; veins not prominent below..............*11. R. Galeottii*
    - Leaflets rugose; veins prominent below.
      - Leaflets usually 5–7; inflorescence diffuse..................*12. R. rubifolia*
      - Leaflets usually 3; inflorescence compact...*12a. R. rubifolia* var. *subcordata*
  - Leaflets when mature petiolulate (very shortly so in No. 15).
    - Bracts glabrous or nearly so, not ciliate at apex; stem glabrate; pubescence coarse, sparse, confined mostly to the areas between the veins........ *13. R. Barclayi*
    - Bracts pubescent, ciliate at apex; stem pubescent (except in No. 16a); pubescence fine, confined chiefly to the veins or densely distributed over the entire under-surface of the leaflets (except in No. 16a).
      - Leaflets mostly oblong-lanceolate; northern Mexico..........*14. R. Palmeri*
      - Leaflets mostly broadly lanceolate to narrowly ovate; central and southern Mexico and Central America.
        - Pubescence of leaflets not confined to veins either above or below, copious below; leaflets more or less acute, subsessile.......... *15. R. costaricensis*
        - Pubescence of leaflets sparse, mostly confined to veins both above and below, or glabrate; leaflets more or less long-acuminate, usually distinctly petiolulate.
          - Leaflets mostly small, with pubescence on veins both above and below; stems pubescent.......................*16. R. terebinthifolia*
          - Leaflets mostly larger, glabrous or glabrate; stems glabrate...... *16a. R. terebinthifolia* var. *Loeseneri*

8. Rhus Hartmanii Barkl., n. sp.[1] Pl. 18, fig. 1.

Shrub or small tree; branches tan, pubescent; leaves compound, petioles about 1.5 cm. long, stout; leaflets about 15, thin, broadly lanceolate, subfalcate, about 2.5 cm. long, 1 cm. broad, subacute at the apex, mucronate, more or less unequal, obtuse

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[1] **Rhus Hartmanii** Barkley, n. sp. Arbuscula; foliis imparipinnatis, foliolis 11–17 tenuibus lato-subfalcatis lanceolatis circiter 2.5 cm. longis 1 cm. latis subacutis mucronatis supra sparse et subtus dense molliterque pubescentibus integris marginibus subrevolutis basi inaequalibus plerumque breve-petiolulatis; floribus multis in spicis terminalibus et lateralibus diffusis compositis dispositis, bracteis persistentibus.—Collected at Oakridge Pass, Sonora, Mexico, alt. 5700 ft., Dec. 12 and 13, 1890, *Hartman 324* (US 306131 **type**).

to cuneate at the base, revolute-margined, entire, dark green, dull and sparsely pubescent above, lighter and densely pubescent beneath, short-petiolulate to subsessile, terminal petiolules about 0.5 cm. long, lateral petiolules about 1–2 mm. long; rachis segments about 1 cm. long; inflorescence a loose, compound spike, terminal and in the axils of the uppermost leaves, bracts ovate, 1 mm. long, 1 mm. broad, rounded at the apex, pilose on both surfaces, ciliate with simple hairs; flowers numerous, sessile; sepals ovate, 1.5 mm. long, almost as broad, glabrous on both surfaces, ciliate with simple hairs, persistent; petals whitish in the dried state, ovate, 2 mm. long, almost as broad, glabrous on the outer surface, pilose on the inner surface, ciliate with simple hairs, filaments shorter than the sepals; anthers oval; fruit red, pubescent with simple and glandular hairs.

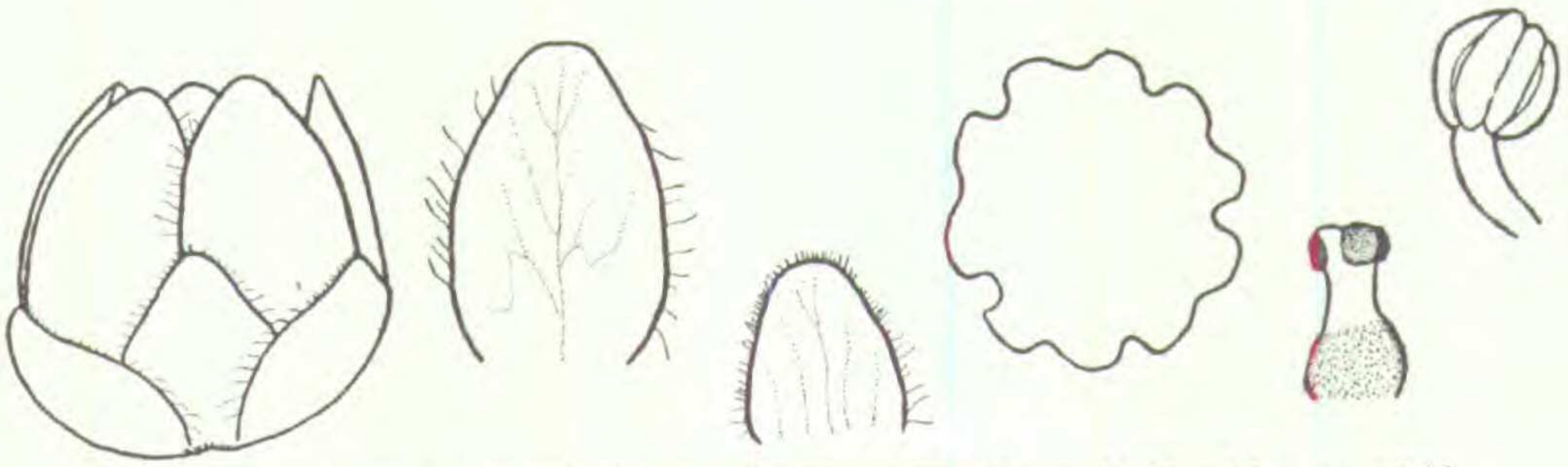

Fig. 11. Floral morphology of *Rhus Hartmanii* Barkl. × 10½.

This species seems to be closely related to *Rhus jaliscana*, but differs from it in being canescent, with much shorter inflorescences which diverge from the axis at a greater angle.

Distribution: Sonora, Mexico (fig. 10).

MEXICO:

SONORA: canyon, Rinconada, Nov. 27, 1890, *Lloyd 378* (US); Oakridge Pass, alt. 5700 ft., Dec. 12 and 13, 1890, *Hartman 324* (Calif, G, M photo., NY, PA, US type); Huehuerachi, Dec. 12, 1890, *Hartman 379* (PA), same locality and date, *Lloyd 379* (Calif, F, G, NY, Penna).

9. **Rhus jaliscana** Standl., Contr. U. S. Nat. Herb. **20**: 219. 1919.

Shrub or small tree, 3–5 m. high; branches tan, appearing glabrate but minutely and sparsely pilose, lenticels prominent; leaves compound, petioles about 2 cm. long; leaflets 13–15, thin, narrowly ovate, bluntly acute and mucronate at the apex, unequal and subcuneate at base, short-petiolulate, subrevolute and entire-margined, barely pilose, bluish, dull, rough to the touch above, barely pilose on the veins and essentially glabrous below, terminal leaflets 2–2.5 cm. long, 0.8–1.1 cm. broad, decurrent, with petiolules 0–0.5 cm. long, lateral leaflets 1.8–3 cm. long, 0.6–1.4 cm. broad, the lower with petiolules 0.4 cm. long, the uppermost sessile; rachis segments about 0.9–1.1 cm. long; inflorescence a loose, terminal, compound spike 25 cm. long, 15 cm. broad, bracts broadly ovate, 1 mm. long, 1.3 mm. broad, rounded at the apex, sparsely pilose at the center on the outer surface, glabrous on the inner surface, ciliate with simple hairs, persistent; flowers numerous, sessile; sepals deltoid-ovate, 1.25 mm. long, 1 mm. broad, glabrous on both surfaces, ciliate with simple hairs; petals whitish in the dried state, deltoid-ovate, about 1 mm. long, 0.8 mm. broad, glabrous on the outer surface, sparsely pilose within, not ciliate; styles 3; disk large, lobed, pink; fruit 7 mm. broad, 6 mm. long, red, pubescent with simple and glandular hairs.

This species is apparently most closely related to *Rhus Palmeri*. However, it has more numerous, smaller, and petiolulate leaflets, and much longer branches to the inflorescence.

Distribution: Jalisco, Mexico (fig. 10).

MEXICO:

JALISCO: barranca, Guadalajara, Nov. 23, 1930, *Jones 27099* (Calif, M, NY); moist places in the barranca near Guadalajara, Nov. 3, 1888, *Pringle 1774* (Calif, F, G, M photo., ND, NY, PA, US **type**); barranca near Guadalajara, Nov. 18, 1889, *Pringle 2756* (B, Calif, F, M), alt. 5000 ft., Dec. 7, 1902, *9712* (F, G, M, NY, US); Barranca Ibarra, Guadalajara, alt. 1500 m., Jan. 1923, *Reko 4600* (US); between Bolanos and Guadalajara, Sept. 22, 1897, *Rose 3093* (US); between Ataquiza and Chapala, Oct. 4, 1903, *Rose & Painter 7608* (G, US); La Barranca, Guadalajara, Feb. 28, 1907, *Safford 1458a* (US).

10. **Rhus Arsenei** Barkl., n. sp.[1] Pl. 18, fig. 2.

Small shrub; branches slender, tan or chocolate-brown,

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[1] **Rhus Arsenei** Barkley, n. sp. Arbuscula; foliis imparipinnatis, foliolis plerumque 3–5 ovalibus circiter 2 cm. longis 1 cm. latis acutis vel rare mucronatis subcuneatis sessilibus marginibus revolutis utrinque pilosis, lateralibus integris, terminalibus saepe 1–2–lobatis vel serratis, rhache non alato; floribus in spicis terminalibus lateralibusque gracilibus diffusis compositis dispositis, bracteis persistentibus.—Collected at Acatzingo, Distrito de Tepeaca, vicinity of Puebla, Mexico, alt. 1900–2110 m., Aug. 1907, *Arsène & Amable 1566* (M **type**).

minutely pubescent, dotted with prominent lenticels; leaves compound, petiole 0.7–1.5 cm. long, slender; leaflets 3–7, thin, elliptical to ovate, acute at apex, rarely mucronate, sessile, revolute-margined, entire or once or twice serrate, pilose, dark and almost shining above, paler and ferruginous-pilose below, terminal leaflet 0.3–2.3 cm. long, 0.1–1 cm. broad, decurrent and thereby cuneate at base, lateral leaflets 0.8–1.8 cm. long, 0.4–1.2 cm. broad, subcuneate to obtuse at base; rachis segments about 0.3–1 cm. long; inflorescence a compound spike, terminal and in the axils of the uppermost leaves, exceeding the leaves in length, about 8 cm. long and 4 cm. broad, bracts broadly ovate, 1 mm. long, about as broad, acute at the apex, sparsely pilose in the center of the outer surface, glabrous on the inner surface, light green, persistent; flowers numerous, sessile; sepals deltoid-ovate 1.2 mm. long, almost as broad, glabrous on both surfaces, ciliate with simple hairs; petals white in the dried state, deltoid, about 1.4 mm. long, 1 mm. broad, glabrous on both surfaces, ciliate; filaments as long as the sepals; anthers oval, 0.5 mm. broad and long; disk 1.5 mm. broad, yellow, lobed; ovary 0.5 mm. broad.

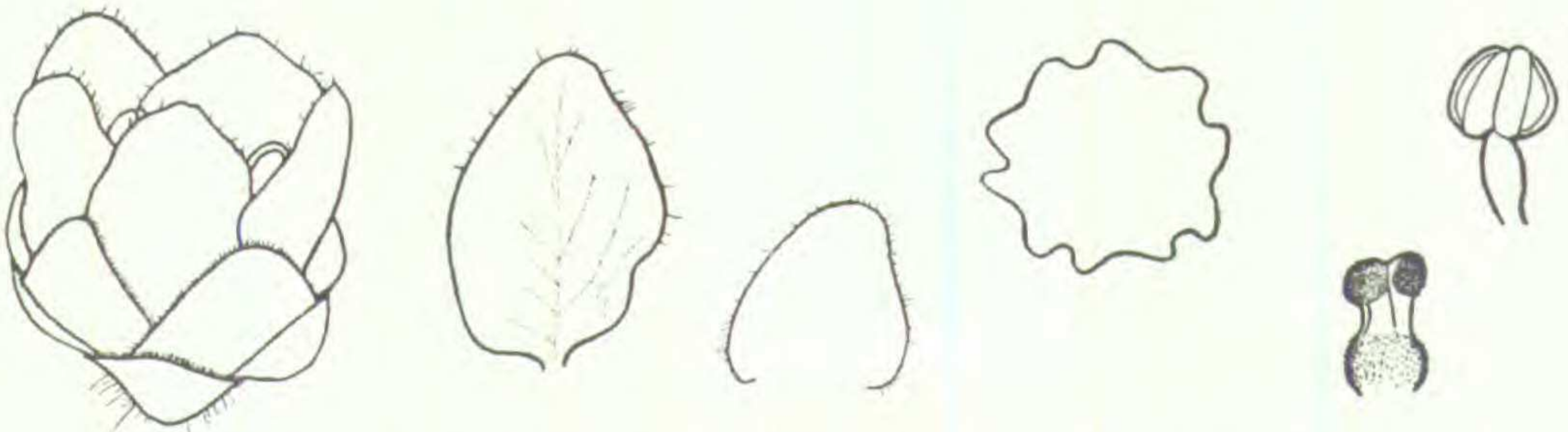

Fig. 12. Floral morphology of *Rhus Arsenei* Barkl. × 10½.

This species is a small shrub with very small, mostly trifoliolate leaves, which are sparsely and coarsely pubescent. The leaflets are mostly sessile and are often tridentate.

Distribution: Puebla and Oaxaca, Mexico, to Guatemala.

MEXICO:

OAXACA: de Las Sedas a Salomé, Distrito de Etla, alt. 2100 m., Aug. 20, 1921, *Conzatti 4205* (US);

PUEBLA: Las Palmillas, Acatzingo, Distrito de Tepeaca, near Puebla, alt. 2110 m., July, 1907, *Arsène & Amable 2255* (M, US); Acatzingo, Distrito de Tepeaca, near Puebla, alt. 1900–2110 m., Aug. 1907, *Arsène & Amable 1566* (M **type**, US); Acatzingo, Feb. 3, 1919, *Arsène "7"* (F).

CENTRAL AMERICA:

GUATEMALA: Brenas y Setos, alt. 1400 m., July 1921, *Tonduz 713* (US).

11. Rhus Galeottii Standl., Field Mus. Bot. Ser. **11**: 163. 1936.

Rhus Metopium Sessé & Moc., Pl. Nov. Hisp., p. 47. 1887, non L., Syst. Nat., ed. 10. **2**: 964. 1759.

Shrubs 1 m. high; twigs very slender, the younger densely pilose, the older more or less glabrate and dotted with a few scattered lenticels; leaves compound, petioles 1.5–3 cm. long, slender; leaflets 3–5, membranaceous, subrevolute, entire or inconspicuously sinuate-crenulate-margined, green and pilose above, somewhat lighter and densely ferruginous-pilose below, terminal leaflet oblong-oval or oval-obovate, 4–7.5 cm. long, 2–4 cm. broad, sometimes trilobate near the apex, cuneate or long-decurrent at the base, with petiolules 2–5 mm. long, lateral leaflets oval, oblong-elliptic or oval-obovate, 2–3.5 cm. long, 1.3–2.2 cm. broad, rounded, submucronate-subemarginate at the apex, rotundate or subcuneate at the base, sessile or subsessile; rachis segments about 1.3 cm. long; inflorescence a small, terminal, compound spike about 2.5–5 cm. long, 2 cm. broad, bracts broadly ovate, 0.5 mm. long, 0.8 mm. broad, rounded at the apex, pilose on both surfaces, somewhat glandularly-hairy, persistent; flowers several, sessile; sepals deltoid-ovate, 1 mm. long, scarcely as broad, glabrous on both surfaces, ciliate with simple hairs; petals whitish in the dried state, rhombic-obovate, about 1.5 mm. long, 0.9 mm. broad, glabrous but with margin ciliate with simple hairs.

This species bears from 3–7 subsessile, thin and rather smooth, typically obovate and obtuse leaflets. Its relationship is obviously between *Rhus rubifolia* and *R. terebinthifolia,* and some of the specimens are separable with difficulty from the latter.

Distribution: Mexico and Oaxaca, Mexico (fig. 10).

MEXICO: without definite locality, coll. of 1787–1804, *Sessé, Mociño, Castillo & Maldoñado 855, 4939* (F, Madrid).

MEXICO: hill, Cañitas, District of Temascaltepec, Oct. 20, 1933, *Hinton 5027* (NY).

OAXACA: Las Sedas, 2080 m., Aug. 1, 1897, *Conzatti & Gonzalez* (G); Talea, Sept. 1844, *Galeotti 7247* (F, US, cotypes, M photo.); Yautepec, Jan. 6, 1896, *Seler 1729* (NY); Las Sedas, alt. 6000 ft., Sept. 1894, *Smith 841* (NY, US).

12. Rhus rubifolia Turcz., Bull. Soc. Nat. Moscou **31**^{1}: 470. 1858.

Toxicodendron rubifolium Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891.

Shrub; branches tan, dotted with prominent lenticels, subglabrous to sparsely pilose; leaves compound, petioles about 2 cm. long; leaflets 5–7, oval to ovate, thin, acute at apex, subcuneate at base, strongly revolute and entire-margined, dark, conspicuously pilose above, densely yellow-pilose below, terminal leaflet 2.5–5 cm. long, 1.3–3 cm. broad, subcordate, petiolules about 1 cm. long, lateral leaflets 2–4 cm. long, 0.8–2.2 cm. broad, sessile; rachis segments 1–2 cm. long; inflorescence a loose terminal compound spike in the axils of the upper leaves, exceeding the leaves in length, bracts broadly ovate, 0.9 mm. long, 1.5 mm. broad, obtuse at the apex, pilose on the outer surface, glabrous on the inner surface, ciliate with simple hairs, persistent; flowers numerous, sessile; sepals deltoid-ovate, 1.1 mm. long, scarcely as broad, glabrous on both surfaces, ciliate with simple hairs; petals pinkish in the dried state, deltoid-ovate to rhombic-ovate, 1.9 mm. long, 1.1 mm. broad, glabrous on the outer surface, sparsely pilose on the inner surface, ciliate; filaments as long as the sepals; anthers oval, 0.6 mm. long, about as broad; disk 1.5 mm. broad, lobed, pink.

Distribution: Oaxaca, Mexico (fig. 10).

MEXICO:

OAXACA: alt. 1750 m., July–Aug. 1900, *Conzatti & Gonzalez 1046* (US); coll. of 1840, *Galeotti 2515* (F photo., M photo.); Monte Alban, alt. 5500 ft., Nov. 24, 1894, *Pringle 583* (G); Monte Alban, Oct. 22, 1904, *Seler 4389* (G, US, M photo.); Monte Alban, Nov. 24, 1894, *Smith 321* in part (G).

12a. Rhus rubifolia var. **subcordata** (Turcz.) Engler in DC., Monogr. Phaner. **4**: 393. 1883.

Rhus subcordata Turcz., in Bull. Soc. Nat. Moscou **31**^{1}: 470. 1858.

Branches gray to brown, at first pilose, later glabrate; leaves usually ternately compound, petioles 1–2 cm. long; leaflets usually 3, ovate, subacute, obtuse to subcuneate at base, thin, rugose, subentire, pilose above and beneath, dark and reddish above, yellowish-green beneath, petiolule of terminal leaflet 1–5 mm. long, lateral leaflets sessile or subsessile; rachis segments about 1 cm. long; inflorescence a very small, terminal, compact, compound spike about 2 cm. long and half as broad.

In the variety the leaflets are fewer than in the species, more cordate at the base, and the inflorescence is more compact.

MEXICO:

OAXACA: Villa Alta to Talea, alt. 1200 m., Feb. 20, 1919, *Reko 4021* (US); Monte Alban, near Oaxaca City, alt. 5500–6000 ft., 1894, *Smith 840* (M, M photo.); Sierra de San Felipe, alt. 7000–8000 ft., Oct. 10, 1894, *Smith 840b* (NY, US); Monte Alban, Nov. 24, 1894, *Smith 321* in part (G).

13. Rhus Barclayi (Hemsl.) Standl., Contr. U. S. Nat. Herb. **20**: 218. 1919.

Rhus terebinthifolia var. *Barclayi* Hemsl., Biol. Cent.-Am. Bot. **1**: 219. 1880.

Branches tan, glabrate; leaves compound, petiole 2–5 cm. long; leaflets about 9, thin, broadly lanceolate, revolute and entire-margined, dark green and dullish above, lighter below, acuminate at apex, subcordate to subcuneate at base, lateral leaflets 2–7 cm. long, 1–3 cm. broad, with petiolules 0.1–0.7 cm. long, terminal leaflets usually smaller, with petiolules about 0.5 cm. long; rachis segments 1–2.5 cm. long; inflorescence a diffuse, compound spike, terminal and in the axils of the uppermost leaves, bracts deltoid-ovate, 1.8 mm. long, 0.8 mm. broad, glabrous on both surfaces, ciliate with simple hairs near the base, persistent; flowers numerous, sessile; sepals deltoid-ovate, 1.5 mm. long, 1 mm. broad, puberulent at base on the outer surface, ciliate with simple hairs; petals whitish in the dried state, ovate, about 2 mm. long, 1 mm. broad, glabrous on the outer surface, pubescent on the inner surface, sparsely ciliate; filaments shorter than the sepals; anthers round; fruit red, pubescent with simple and glandular hairs.

This species is a west-coast relative of *Rhus terebinthifolia*, but differs from that species in having a coarse pubescence scattered over the leaflets, a glabrous stem, and non-ciliate floral bracts.

Distribution: Jalisco and Tepic, Mexico (fig. 10).

MEXICO:

JALISCO: Arroyo Seco Canyon, trail from San Sebastian to Arroyo Seco, Sierra Madre Occidental, alt. 1500 m., Jan. 8, 1927, *Mexia 1433* (CA, Calif, F, M, NY, US).

TEPIC: Sierra de Nayarit, Feb. 10, 1927, *Jones 23130* (Calif, M, NY), Feb. 14, 1927, *22887* (CA, Calif, F, G, NY), Feb. 15, 1927, *22886* (Calif, F); between Colomo and Arroyo Juan Sanchez, alt. 800–2000 ft., April 6, 1897, *Nelson 4166* (US); Jan. 5–Feb. 6, 1892, *Palmer 1907* (F, G, M photo., NY, US).

14. Rhus Palmeri Rose, Contr. U. S. Nat. Herb. 1: 95. 1891.

Shrub 1.5–2 m. high; branches brown, pubescent; leaves compound, petioles about 1.5 cm. long, stout; leaflets about 11, thin, oblong-lanceolate, 3–5 cm. long, 1–2 cm. broad, falcate, acute at apex, submucronate, more or less unequal at the cuneate or subcuneate base, revolute-margined, entire, dark green, dull, and pubescent above, lighter and densely pubescent beneath, short-petiolulate to subsessile, terminal petiolule about 0.8 cm. long, lateral petiolules 0.5–2 mm. long; rachis segments about 1.3 cm. long; inflorescence a loose, mostly terminal, compound spike, bracts deltoid-oval, 1.2 mm. long, 1 mm. broad, rounded at the apex, pilose on both surfaces, ciliate with simple hairs; flowers numerous, sessile, each flower subtended by a bract and two bracteoles; fruit 5 mm. long, 6 mm. broad, red, pubescent with simple and glandular hairs.

This species is a subcanescent shrub, having about 9–11 rather large leaflets and a small terminal inflorescence. Its affinity is with *Rhus jaliscana* and *R. terebinthifolia.*

Distribution: Sonora, Sinaloa, and Durango, Mexico (fig. 10).

MEXICO:

DURANGO: Sianori, 1924, *Ortega 5385* (G, US); San Ramon, April 21–May 18, 1906, *Palmer 159* (US).

SINALOA: moist places, Cerro del Palo Solo, San Ignacio, alt. 700 m., May 14, 1919, *Montes & Salazar 832* (US); Balboa, Jan. 1923, *Ortega 4984* (US).

SONORA: Sierra de Los Alamos, March 25–April 8, 1890, *Palmer 321* (US **type**, M photo.); near Alamos, high up in the Sierra de Alamos, March 19, 1910, *Rose 13100* (G, NY, US).

15. Rhus costaricensis Riley, Kew Bull. Misc. Inf. for 1922, p. 184. 1922.

Rhus terebinthifolia var. *pilosissima* Loesen., Bull. Herb. Boiss., II. 6: 836. 1905.

Shrubs; branches maroon-colored, obscured by a dense ferruginous pilosity, dotted with prominent lenticels; leaves compound, petioles about 2.3 cm. long, stout; leaflets 5–9, thin, elliptic-ovate, acute at apex, obtuse at base, revolute-margined, entire, sparsely pilose, dark, almost shining above, lighter and dull, ferruginous-pubescent below, terminal leaflet 3.5–5 cm. long, 1.8–2.6 cm. broad, somewhat decurrent on the 0.5-cm. long petiolule, lateral leaflets 3.2–5 cm. long, 1.4–2.5 cm. broad, sessile or subsessile; rachis segments about 1.4 cm. long; inflorescence a strictly terminal, compound spike 12 cm. long, 17 cm. broad, bracts broadly ovate, 1 mm. long, about as broad, acute at the apex, sparsely pilose on the outer surface, glabrous on the inner surface, ciliate with simple hairs, persistent; flowers numerous, sessile; sepals deltoid-ovate, acute, about 1.2 mm. long and broad, glabrous on both surfaces, ciliate with simple hairs; petals tan-white in the dried state, oval to ovate, 1.5 cm. long, 1 cm. broad, glabrous on the outer surface, pilose on the inner surface, ciliate with very long (0.5 mm.) simple hairs; filaments as long as sepals; anthers oval, about 0.5 mm. in diameter; fruit 7 mm. long, 8 mm. broad, red, pubescent with simple and glandular hairs.

This is a densely canescent and rather distinct species. Several specimens of intermediate character between this species and *Rhus integrifolia* were found, which probably are due to hybridization.

Distribution: Guerrero to Chiapas, Mexico, south to Costa Rica (fig. 10).

MEXICO:

Chiapas: Comitan, 1620 m., June 11, 1906, *Cook 83* (US); Tuxtla Guttierrez, Jan. 11, 1926, *Juzepczuk 1473* (F); between Llunir and Zoteapa, Jan. 13, 1926, *Juzepczuk 1520* (F); between Arriaga and Pichucalco, Jan. 21, 1926, *Juzepczuk 1846* (F); between San Cristobal and Teopisca, alt. 6700–8500 ft., Dec. 4, 1895, *Nelson 3451a* (F, US).

Guerrero: between Petatlen and Chilapa, alt. 5000–6500 ft., Dec. 15, 1894, *Nelson 2148* (G, US).

CENTRAL AMERICA:

Guatemala: coll. of 1892, *Heyde 549* (US); alta verapaz: Cobán, Jan. 1908, *von Tuerckheim II 1506* (US); huehuetenango: Jacaltenango, May 31, 1905, *Cook 55* (US); santa rosa: Carrizal, alt. 5000 ft., Jan. 1893, *Heyde & Lux (Donnell Smith 4330)* (G, NY, US).

SALVADOR: SAN VICENTE: Volcan de San Vicente, alt. 1200–1500 m., March 7–8, 1922, *Standley 21530* (NY, US).

HONDURAS: COMAYAGUA: El Playon, San Luis, alt. 3500 ft., May 20, 1932, *Edwards P-257* (F); hills above the plains of Siguatepeque, near El Achote, alt. 1350 m., Aug. 5, 1936, *Yuncker, Dawson & House 6344* (F); COPÁN: El Cordoncillo, Agua Fria Valley, near Copán, alt. 700 m., Jan. 7, 1907, *Pittier 1825* (US).

COSTA RICA: Tablazo, alt. 1800 m., Jan. 23, 1935, *Valerio 1038* (F); Cartago, alt. 4250 ft., March 1888, *Cooper 348 (Donnell Smith 5729)* (F, G, M, NY, US); El Llamo, alt. 1400 m., 1926, *Rojas 203* (US); SAN JOSÉ: banks of Rio Virilla, alt. 1100 m., Dec. 1895, *Tonduz 9823 (Donnell Smith 6999)* (F, G, M, NY, US, cotypes).

16. **Rhus terebinthifolia** Schlecht. & Cham., Linnaea **5**: 600. 1830.

Toxicodendron terebinthifolium Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891.

Shrubs 1.5–3 m. high; branches ferruginous-pubescent to subglabrous; leaves compound, petioles 1–2.5 cm. long, slender; leaflets 3–11, thin, elliptical to lanceolate, acute, mucronate or acuminate at the apex, subcuneate and unequal at the base, revolute-margined, entire, sparsely pilose above and beneath, dark and almost shining above, duller and paler beneath, terminal leaflet 2–3.5 cm. long, 0.8–1.2 cm. broad, decurrent and subsessile, lateral leaflets 2–4.5 cm. long, 0.7–1.5 cm. broad, sessile or subsessile; rachis segments 1–2 cm. long; inflorescence a slender, compound spike, terminal and axillary to the upper leaves, exceeding the leaves in length, 9 cm. long, 10 cm. broad, bracts broadly ovate, 1 mm. long, about as broad, acute at the apex, sparsely pilose in the center on the outer surface, glabrous on the inner surface, ciliate with simple hairs, persistent; flowers numerous, sessile, sepals deltoid-ovate, 1 mm. long, about as broad, glabrous on both surfaces, ciliate with simple hairs, light green; petals white in the dried state, deltoid-ovate, about 1.5 mm. long, almost as broad, glabrous on both surfaces, ciliate; filaments about as long as the sepals; anthers oval, 0.5 mm. long, about as broad; disk 1.5 mm. broad, white, lobed; fruit 6 mm. broad, 5 mm. long, red, pubescent with simple and glandular hairs.

This species hitherto has been frequently misinterpreted, and as a result most of the specimens of the section PSEUDOSUMAC collected until quite recently have been referred here.

The leaves are shining, but pubescent on the veins, and in herbarium material are often blackened.

Distribution: Tamaulipas to Guerrero, in Mexico, south to Costa Rica (fig. 10).

MEXICO: coll. of 1791, *Haenke 1504* (F); coll. of 1905, *Lemmon* (Calif, US); Mirador, Oct. 11, 1841, *Liebmann 29* (G, M, NY), Feb. 3, 1842, *31* (G), coll. of 1841–1843, *284* (Calif, US).

CHIAPAS: Canjób, April 30, 1904, *Goldman 917* (US); between San Cristobal and Teopisca, alt. 6700–8500 ft., Dec. 4, 1895, *Nelson 3464* (G, US).

GUERRERO: Acapulco, coll. of 1791, *Haenke 1245* (F).

PUEBLA: Pahuatlán, March 1914, *Salazar* (US).

TAMAULIPAS: Juamave, Feb. 3, 1932, *von Rozynski 784* (F, NY).

VERA CRUZ: Valle de Cordoba, Dec. 15–16, 1865, *Bourgeau 1476* (G, US), Feb. 2, 1866, *1892* (G); Canton de Huatusco, alt. 1200 m., Dec. 1898, *Conzatti 826* (US); Orizaba, Sierra de San Cristobal, 1853, *Mueller 1082, 1281* (NY); Zacuapan and vicinity, Oct. 1906, *Purpus 2279* (Calif. F, G, M, NY, US); in the woods of Papantla, Jan. 1829, *Schiede 715* (F, G, M, **cotypes**).

CENTRAL AMERICA:

GUATEMALA: Sept. 1927, *Morales 769* (US); Dec. 26, 1896, *Seler 3296* (G); ALTA VERAPAZ: in scrub, Cobán, alt. 4000 ft., Aug. 28, 1920, *Johnson 628* (US); Cobán, alt. 4300 ft., Feb. 1886, *von Tuerckheim (Donnell Smith 340)* (F, G, NY, PA, US), alt. 1350 m., Jan. 1908, *II 1506* (F, M); BAJA VERAPAZ: near Rosa, alt. 1600 m., May 6, 1906, *Cook 9* (US, M photo.); San Augustin, Sierra de las Minas, Jan. 15, 1908, *Kellerman 7620* (F); CHIMALTENANGO: Nov. 2, 1936, *Alameda 236* (F); ESCUINTLA: Santa Lucia, alt. 5200 ft., Oct. 1922, *Salazar 97* (US); QUICHÉ: San Miguel, Uspantán, alt. 6000 ft., April 1892, *Heyde & Lux 517 (Donnell Smith 3277)* (G, M, NY, US).

SALVADOR: MORAZÁN: Sierra de Osicala, 1929, *Calderon 2500* (F, US); SAN VICENTE: Volcán de San Vicente, alt. 1200–1500 m., March 7–8, 1922, *Standley 21530* (G).

HONDURAS: Yoro, alt. 2800 ft., Feb. 5, 1934, *Edwards 754* (F).

COSTA RICA: CARTAGO: Cerro de La Carpintera, alt. 1500–1850 m., Feb. 1924, *Standley 35476* (US); Dulce Nombre, alt. 1400 m., Feb. 27, 1924, *Standley 35833* (US).

16a. **Rhus terebinthifolia** var. **Loeseneri** Barkl., n. var.[1]

Leaflets large, stems and leaves glabrous.

The variety has larger leaflets than the species, and the entire plant is glabrous except for the coarse pubescence in the inflorescence.

CENTRAL AMERICA:

GUATEMALA: ALTA VERAPAZ: Tactic, Dec. 23, 1896, *Seler 3287* (G, NY, US **type**, M photo.).

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[1] **Rhus terebinthifolia** var. **Loeseneri** Barkley, n. var. Arbuscula cum foliolis magnis late lanceolatis glabra inflorescentia excepta.—Collected at Tactic, Alta Verapaz, Guatemala, Dec. 23, 1896, *Seler 3287* (US 1400804 **type**).

HONDURAS: COMAYAGUA: El Achote, near Siquatepeque, alt. 1500 m., Feb. 18–19, 1928, *Standley 56098* (F, US).

Section STYPHONIA (Nutt.) Barkley, n. sect.

Styphonia Nutt. in Torr. & Gray, Fl. N. Am. **1**: 220. 1838.
Neostyphonia Shafer in Britt., N. Am. Trees, p. 612. 1908.

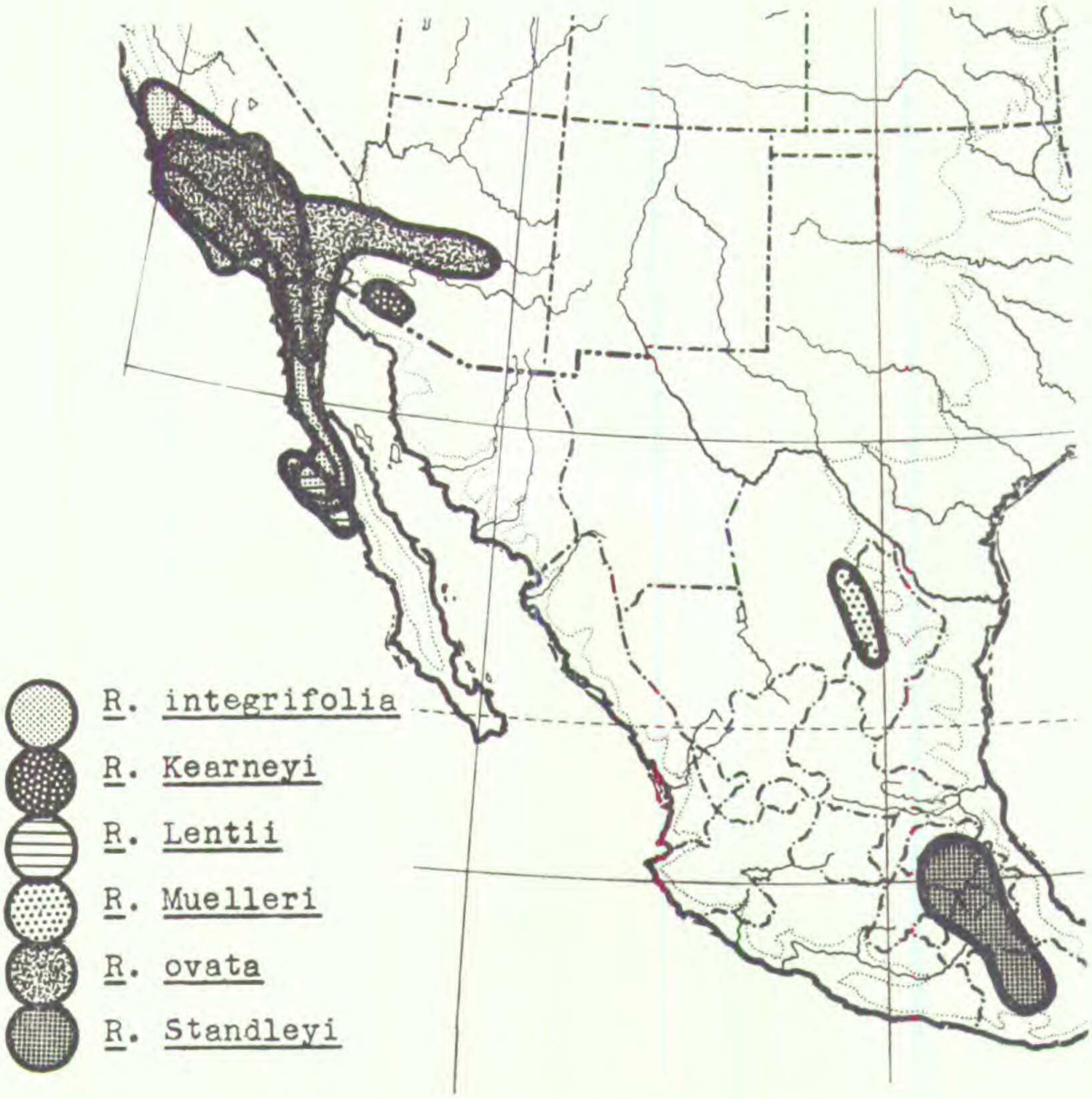

Fig. 13. The geographic distribution of the species in Section STYPHONIA.

Evergreen trees and shrubs with rigid, thickened branches. Flowers many, white or pink, in apically clustered spikes formed in autumn, expanding with the leaves, polygamodioecious, mostly sessile. Bracts of the inflorescence subovate and subacute to broadly lanceolate, mostly persistent, one bract and two bracteoles subtending each flower. Drupe red, flattened, broader than long, leaves simple or rarely trifoliolate, coriaceous, shining above, entire or often repand-serrate, glabrous to densely pubescent.

Southern Mexico to California (fig. 13).

Type species: **Rhus integrifolia** (Nutt.) Benth. & Hook. f. ex Rothrock in Wheeler's Rept. U. S. Geogr. Surv. **4**: 84. 1878 (*Styphonia integrifolia* Nutt. ex Torr. & Gray, Fl. N. Am. **1**: 220. 1838).

STYPHONIA is a very well-marked group of small evergreen trees having thick, simple leaves. The inflorescences are compact, compound, terminal spikes with large flowers about 6 mm. long. Most of the species have rather large fruits which are usually much compressed laterally. The species occur from southern California to southern Mexico.

KEY TO SPECIES AND VARIETIES

Inflorescence not spicate, bracts deciduous, flowers short-pedicellate; leaves glaucous, minutely short-appressed puberulent above, white hoary-tomentose beneath, margin not at all revolute. . . . . *17. R. Lentii*

Inflorescence usually with dense spicate branches, bracts usually persistent, flowers sessile; leaves soft-tomentose or mostly glabrous, margin revolute.

Leaves pilose with spreading hairs and with glandular pubescence on lower surface; bracts deltoid; leaves elliptic to orbicular, very short-petiolate or sessile.

Leaves densely pilose, margin strongly recurved, subsessile; bracts long-deltoid; petals not ciliate, pinkish, sepals rose-red; southern Mexico . . . . *18. R. Standleyi*

Leaves sparsely pilose, margin merely revolute, short-petiolate; bracts ovate-deltoid; petals ciliate, whitish, sepals whitish; northern Mexico . . . . *19. R. Muelleri*

Leaves essentially glabrous at maturity; bracts ovate; leaves orbicular to ovate, petiolate.

Leaves obtuse or subacute, flat, more or less short-petiolate; fruit 9 × 11 mm.

Sepals and bracts ciliate with glandular hairs; leaves mostly oval, base cuneate to obtuse, not subcordate; California and Lower California.

Leaves obtuse; inflorescence compact. . . . . *20. R. integrifolia*

Leaves subacute; inflorescence more or less diffuse. . . . . *20a. R. integrifolia* var. *cedrosensis*

Sepals and bracts ciliate, but not glandularly so; leaves mostly oblong-elliptic; base of leaves subcordate; Arizona. . . . . *21. R. Kearneyi*

Leaves acute, often conduplicate, usually long-petiolate; fruit smaller.

Long-petiolate; sepals and bracts ciliate with simple hairs. . . . . . *22. R. ovata*

Short-petiolate; sepals and bracts ciliate with simple and glandular hairs . . . . *22a. R. ovata* var. *Traskiae*

17. Rhus Lentii Kellogg, Proc. Calif. Acad. Sci. **2**: 16. 1863; Just's Bot. Jahresb. **21**^{2}: 158, 654. 1893, as *R. Leutii.*

Toxicodendron Lentii Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891.

Shrub 1.5–3 m. high; branches maroon, at first puberulent; leaves simple, coriaceous, rugose, blades orbicular or less often subovate, 1.5–6 cm. long, 1.2–5 cm. broad, obtuse at base and apex, or apex subacute, not at all revolute-margined, entire, upper surface gray-glaucous, minutely short-pubescent, lower surface tan, glaucous, densely white hoary-villous; petioles 0.2–4 cm. long, stout, pubescent; inflorescence a terminal open thyrsus about 3 cm. long, somewhat broader, bracts ovate, 1.75 mm. long, 1.75 mm. broad, acute-tipped, pubescent, early deciduous; flowers numerous, pedicellate; sepals subrotund, about 3 mm. long, two-thirds as broad, pilose on the outer surface and on the margin; petals yellowish in the dried state, obovate-rotund, about 4 mm. long, 3 mm. broad, essentially glabrous on the outer surface, sparsely long-pilose on the inner surface, ciliate with simple hairs; fruits red, pilose and glandularly hairy, 15 mm. long, 15 mm. broad, strongly flattened.

The morphology of this species is in several respects anomalous for the subgenus. Most outstanding is the inflorescence, which is a coarse terminal panicle. The floral bracts, while of the usual form for the subgenus, are usually deciduous. The fruit is much larger than in any other *Rhus*. On the other hand, many characters are such as to leave no doubt of its relationship to STYPHONIA, and it seems probable that it is a "primitive" type in this group.

Distribution: endemic on Cedros Island and in a limited area of Lower California (fig. 13).

MEXICO:

LOWER CALIFORNIA: San Pablo Point, June 22, 1897, *Anthony* (Calif); San Bartolome Bay, April 12, 1897, *Brandegee* (Calif), and March 13, 1911, *Rose 16212* (US); San Pablo Bay, Dec. 10, 1889, *Pond* (US); CEDROS ISLAND:—Aug. 4, 1922, *Anchorage & Hanna* (CA); July–Oct. 1896, *Anthony 98*, and March–June 1897, *305* (Calif, F, M, US); April 2, 1897, *Brandegee* (Calif); Turtle Bay, June 1, 1925, *Mason 1970*, and June 3, 1925, *1985* (CA, F, US); March 18–20, 1889, *Palmer 730* (Calif, F, ND, US); Dec. 8, 1888, *Pond* (ND), Feb. 1889 (US); March 10, 1910, *Rose 16049* (US); June 3, 1925, *Solis* 3 (US); 1905-1906, *Stewart 68* (CA); 1857, *Veatch* (CA type, M photo.).

18. Rhus Standleyi Barkl., n. nom.

Rhus mollis HBK., Nov. Gen. & Sp. **7**: 602. 1824, non Jacq. Fragm. Bot. Illustr., *pl. 115*. 1809.

Styphonia mollis Nutt. ex Torr. & Gray, Fl. N. Am. **1**: 220. 1838.

Toxicodendron molle Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891.

Shrub or small tree, 1.5–5 m. high; branches maroon, hirsute; leaves simple, subsessile, thin, subrugose, broadly obovate, 4.5–8.5 cm. long, 2–5.5 cm. broad, cuspidate-acute or obtuse, rarely emarginate, auriculate, entire or rarely lobed near the base, strongly revolute-margined, upper surface bright green, shining through the soft pubescence, paler green beneath, villous, glandularly pubescent; inflorescence a terminal, very dense, compound spike about 5 cm. long, nearly as broad, bracts ovate to deltoid-lanceolate, 2.2–5 mm. long, 2 mm. broad, acute-tipped, pilose and glandularly haired, ciliate with simple hairs, persistent; sepals subrotund, about 2.5 mm. long, 1.5 mm. broad, pilose near the midrib and base on the outer surface, ciliate with long simple hairs, persistent; petals white to pinkish in the dried state, obovate-rotund, about 3 mm. long, 1.75 mm. broad, entirely glabrous, not ciliate; filaments slightly shorter than the sepals; anthers rotund, 0.8 mm. long and broad; fruit 7 mm. in diameter, flattened, red, pubescent with intermixed simple and glandular hairs.

This is an old, well-established, and very distinct species of southern Mexico, which has soft-pubescent, thin leaves with strongly revolute margins. The term *Rhus mollis* having been preoccupied, the author has renamed the plant after P. C. Standley of the Field Museum, Chicago.

Distribution: Hidalgo to Vera Cruz and Oaxaca (fig. 13).

MEXICO: without definite locality, coll. of 1868, *Hahn* (M).

HIDALGO: Dublan, alt. 6800 ft., Oct. 15, 1902, *Pringle 9711* (F, M, US).

MEXICO: between Tula and Cuantitlan, Jan. 6, 1849, *Gregg 600* (M); hills of Rio Hondo, alt. 7800 ft., Feb. 12, 1899, *Pringle 7725* (F, M).

OAXACA: Cerro San Antonio, alt. 1700 m., Oct. 1906, *Conzatti 1579* (US); Miahuatlan to Ejutla, alt. 2300 m., Dec. 15, 1906, *Conzatti 1640* (F, US); Cerro Santo Domingo, alt. 1000 m., Dec. 22, 1906, *Conzatti 1655* (F); Cerros de Nochixtlan, alt. 2200 m., Oct. 17, 1921, *Conzatti 4293* (US); Lomas de Las Sedas, Distrito de Etla, alt. 1950 m., Oct. 18, 1933, *Conzatti 4988* (M); near Oaxaca, alt. 6000 ft., Aug. 1894, *Pringle 4815* (B, Calif, F, M, ND, US); Parian, Nov. 27, 1895, *Seler 1487* (US); Las Sedas to Huitzo, Distrito de Etla, alt. 1900 m., Dec. 23, 1920, *Silvio & Conzatti 4100* (US); Las Sedas, alt. 6000 ft., Sept. 8, 1894, *Smith 840a* (M); Monte Alban, near Oaxaca City, alt. 5500–6000 ft., Oct. 1894, *Smith 839* (US), Nov. 1894, *739* (M, US).

PUEBLA: Acatzingo, near Puebla, Distrito de Tepeaca, alt. 1900–2110 m., July 1907, *Amable & Arsène 3597* (M, US); vicinity of Puebla, alt. 2330 m., Sept. 16, 1907, *Arsène 1907* (M, US); Acatzingo, 1908, *Arsène 9* (F); alt. 2330 m., Sept. 16, 1936, *Arsène 2066* (US); Tehuacan, Dec. 1841, *Liebmann 1484F* (Calif), *8664* (US), *14847* (F); Cepoxuchil, alt. 2330 m., Oct. 27, 1909, *Nicolas* (US), *5053* (US); near San Luis Tultitlanapa, near Oaxaca, July 1908, *Purpus* (Calif); Esperanza, April 1912, *Purpus 5819* (Calif, F, US); Tepeaca to Santa Rosa, June 27, 1899, *Rose & Hough 4721* (US); Tehuacan to Esperanza, Sept. 14, 1906, *Rose 11435* (US).

TLAXCALA: Santa Ana Chiantempan, near Puebla, alt. 2250 m., Nov. 14, 1907, *Arsène 1850* (US); Nov. 6, 1908, *Arsène* (M, US).

VERA CRUZ: Maltrata, Jan. 1883, *Kerber 246* (US).

19. **Rhus Muelleri** Standl. & Barkl., n. sp.[1] Pl. 19, fig. 1.

Shrub or small tree; new branches brown, puberulent, soon becoming furrowed and rough; leaves orbicular, 4.5–7 cm. long, 3.5–5.5 cm. broad, thin-coriaceous, obscurely repand-serrate or entire, more or less revolute-margined, obscurely puberulent above, somewhat puberulent and glandularly pubescent beneath, obtuse at apex, cordate or subcordate at base; petioles short, 2–4 mm. long; inflorescence a small, dense, terminal, compound spike, bracts broadly deltoid–ovate, densely pilose, more or less persistent; sepals ovate, 2 mm. long, 1.5 mm. broad, pilose on the outer surface, sparsely pubescent on the inner surface, ciliate with simple hairs; anthers ovate, 0.8 mm. long, filaments about 0.8 mm. long; fruit red, oblong, constricted at the ends, laterally compressed, pubescent with simple and glandular hairs.

This species is undoubtedly related to *Rhus Standleyi*, from which it differs in being so sparsely pilose as to appear glabrous, in having short petioles, merely revolute leaf-margins, ovate-deltoid bracts, and ciliate petals. It is named after the collector, C. H. Mueller.

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[1] **Rhus Muelleri** P. C. Standley & F. A. Barkley, n. sp. Arbuscula; foliis orbicularibus circiter 6 cm. longis 4.5 cm. latis sparse pilosis subtus glandulosis, marginibus obscure crenulato-serratis plus minusve revolutis; floribus in spicis parvis densisque terminalibus compositis dispositis, bracteis bracteolisque deltoideo-ovatis ciliatis persistentibus; floribus circiter 4.5 mm. longis; petalis ciliatis—Collected in mountains near Monterey, Nuevo Leon, Mexico, July 15, 1933, *C. H. & M. T. Mueller 328* (F **type**).

Distribution: Coahuila and Nuevo Leon (fig. 13).

MEXICO:

Coahuila: northwest slopes of Sierra San Lázare, Municipio de Castaños, June 18, 1936, *Wynd & Mueller 169* (M).

Nuevo Leon: dry exposed ridge, Top o' World, mountains near Monterey, July 15, 1933, *Mueller 328* (F 683108 **type**).

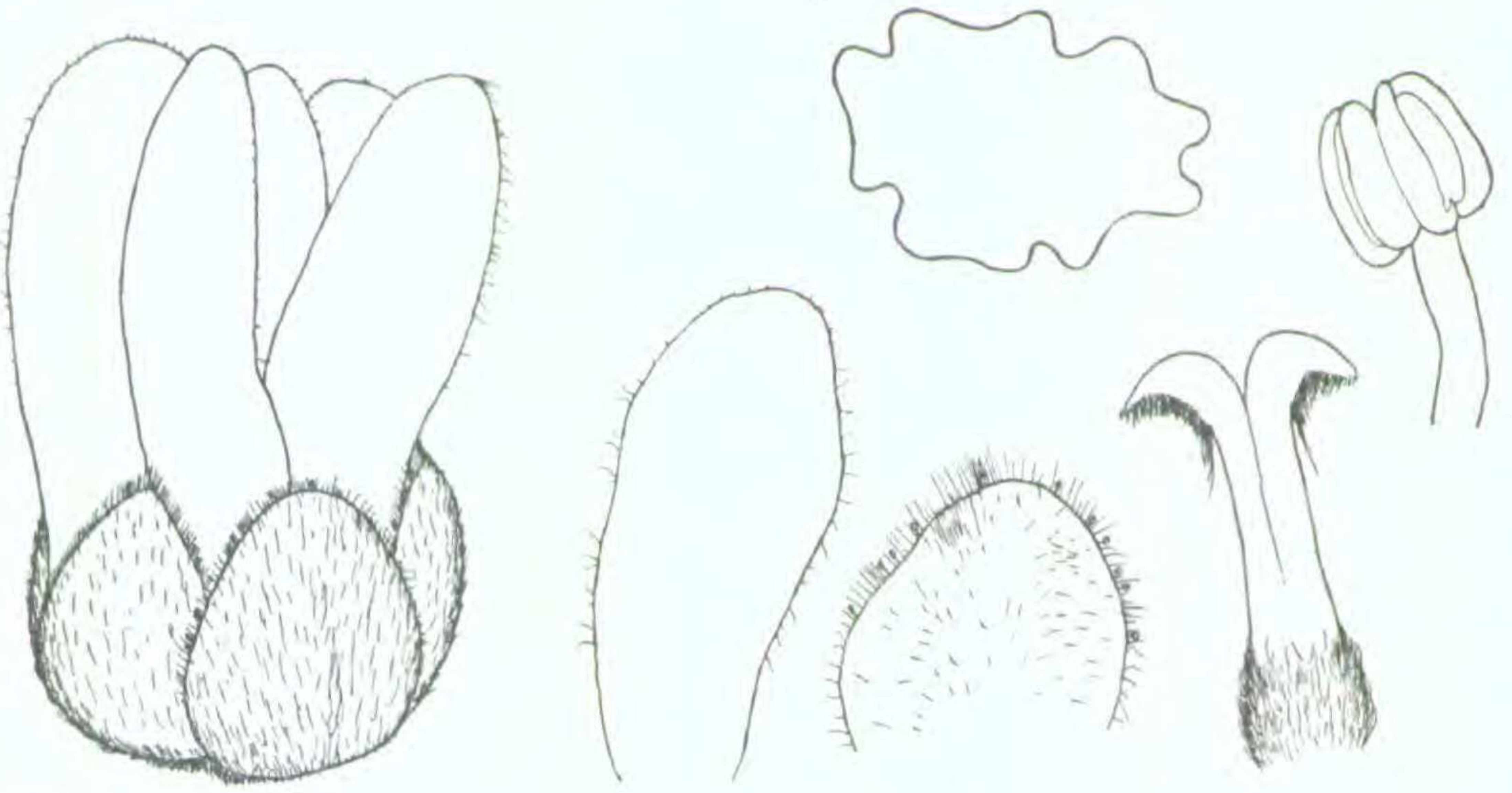

Fig. 14. Floral morphology of *Rhus Muelleri* Standl. & Barkl. × 10½.

20. Rhus integrifolia (Nutt. ex Torr. & Gray) Benth. & Hook. f. ex Rothr. in Wheeler's Rept. U. S. Geogr. Surv. **6**: 84. 1878; Benth. ex Engler in DC., Monogr. Phaner. **4**: 388. 1883; Engler, *ibid.*, p. 387, in part.

Rhus integrifolia var. *serrata* (Nutt.) Engler, *ibid.*, p. 388.

R. Hindsiana Engler, *ibid.*

Neostyphonia integrifolia Shafer in Britt., N. Am. Trees, p. 612. 1908.

Styphonia integrifolia Nutt. ex Torr. & Gray, Fl. N. Am. **1**: 220. 1838; Bentham, Bot. Voy. Sulphur **1**: 11. 1844.

S. serrata Nutt. ex Torr. & Gray, Fl. N. Am. **1**: 220. 1838.

Toxicodendron Hindsianum Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891.

T. integrifolium Kuntze, *ibid.*

Shrub or small tree, 1–8 m. high; branches chocolate-brown, more or less obscured by a dense gray pubescence, later gray, glabrate, dotted with brown lenticels; leaves usually simple but sometimes trifoliolate, ovate, ovate-elliptic, or elliptic-lanceolate, 1.25–6.25 cm. long, 1–3.5 cm. broad, rounded-obtuse or rarely subacute, obtuse to subcuneate at base, subrevolute-margined, entire, or irregularly or regularly repand-serrate, upper surface scurfy-crustose, silvery, lower at first pubescent, yellowish-green; petioles 0.2–0.8 cm. long, stout, pubescent; inflorescence a small, terminal, compound spike 3 cm. long, slightly narrower, bracts broadly deltoid, 2–3.5 mm. long, about half as broad, densely non-glandular-pubescent on the outer surface but with a few glandular hairs interspersed, ciliate with glandular and non-glandular hairs, persistent; flowers numerous, sessile; sepals subrotund, about 3 mm. long, nearly as broad, glabrous except for the pilose base on the outer surface, ciliate with simple and glandular hairs; petals reddish in the dried state, obovate-rotund, about 3.75 mm. long, two-thirds as broad, pilose at the base on the inner surface, ciliate with simple hairs.

This species of the coastal regions of southern California and northern Lower California has thick-coriaceous leaves. The extreme variation in leaf-margin, from entire to regularly repand-serrate, early led to its interpretation as two species. This character, while apparently consistent in some specimens, is quite variable in others. The specimen on which *Rhus Hindsiana* is based has somewhat longer leaves than is typical, but all intermediate types have been observed and in other respects the specimens are typical. On Santa Catalina Island and in the Santa Monica Mountains variability in leaf form is much greater than in most of its other area of distribution. On Santa Catalina Island trifoliolate-leaved specimens are common. The variety is from Cedros Island, and has subacute leaves, more or less deciduous bracts, and inflorescences intermediate in type between those of the species and those of *Rhus Lentii*. Further study may show this variety to be a hybrid between *Rhus Lentii* and *R. integrifolia*.

Distribution: southern California and northern Lower California (fig. 13).

UNITED STATES:

CALIFORNIA: southwestern California, July 1902, *Grant 1356* (US); foothills of the San Bernardino Mts., March 1881, *Parish 705* in part (Calif); Mojave, 1860–1861, *Cooper 376* (US); Claremont, April 1, 1904, *Baker 4156* (Calif); Santa Monica Exp. Sta., Jan. 1897, *Barber 289* (Calif); Santa Monica, July 3, 1904, *Berg* (Calif); Griffith Park, June 4, 1902, *Braunton 389* and *390* (US); Santa Monica Mts., *Clokey & Templeton 4605* (M); Santa Monica, Oct. 1896, *Davy 2769* (Calif); Las Flores Canyon, Santa Monica Mts., March 28, 1930, *Epling & Ellison* (M, US); Garvanza, May 1902, *Grant 1120* (F); Santa Monica, July 1902, *Grant 1118* (F); Pasadena, April 1904, *Grant 1120* (Calif); Claremont, July 7, 1898, *Hall 978* (Calif); Los Angeles, Sept. 1887, *Hasse* (F); Santa Monica Mts., Feb. 1890, *Hasse* (M); Los Angeles, Feb. 19, 1890, *Hasse* (US); Claremont, April 1912, *Howery* (M); San Gabriel, *Lobb 405* (K, M photo.); Tuna Canyon, Verdugo Hills, alt. 1100 ft., March 20, 1931, *MacFadden 10E* (Calif); Elysian Park, Los Angeles, March 13, 1901, *Setchell* (Calif); San Fernando Valley, alt. 650 ft., May 1, 1912, *Smith 4903* (F); SANTA CATALINA ISLAND:—Jan. 30, 1874, *Baker & Dall* (US), *17* (F, US); May 20, *Brandegee* (F); March 31, 1889, *Fritchey* (M); Avalon, June 16, 1936, *Hall 8288* (Calif); June and July, *Knopf 311* (F); Pebble Beach Canyon, March 2–April 10, 1921, *Knopf* (F), *10* (US), April 9, 1922, *273*, Aug. 6, 1922, *487*, *488*, *489*, and Aug. 1922, *490* (F); April 1885, *Lyon 233* (F, G); Hamilton Beach Canyon, Jan. 3, 1920, *Millspaugh 4533* (F); Cherry Valley, March 17, 1920, *Millspaugh 4800* (F); Pebble Beach, April 1, 1920, *Millspaugh 4915* (F); Schoolhouse Mountain, April 28, 1920, *Nuttall 13* (F); Cherry Cañon, June 12, 1912, *Smith 5090* (F); Pebble Beach Cañon, alt. 50 ft., June 18, *Smith 5116* (F); Nov. 1908, *Sudworth* (US); Avalon, Feb. 1896, *Trask* (US), *91* (F, US), Oct. 1896 (M), Dec. 1896 (Calif), April 1897 (US), April 1897, *95* and *103*, and Feb. 1898, *142* (F, US), in arroyas, Feb. 1898 (US), March 1898, *Trask*, in part (US), 1898, *248* and *418*, and Jan. 1901, *417*, (F, NY), March 1899, *249* (F, G), Feb. 1901 (ND), June 1896 (Calif);—near Soledad on Soledad River, Oct. 1903, *Sudworth* (US); Santa Ana Canyon, March 9, 1929, *Blankinship* (M); Orange Co., 1902, *Zumbro 387* (Calif); Wilder's Cañon, Jumba Hills, Riverside, Feb. 23, 1908, *Reed 2238* (Calif, F); Arcamorga Wash, east of Upland, alt. 1600 ft., March 10, 1917, *Johnston 60* (Calif); Mission Creek, San Bernardino, March 8, 1930, *Jones 26543* (ND); hills near Edclez, April 4, 1909, *Parish 6890* (Calif); low hills, San Bernardino, March 1881, *Parish 705* (F); Santa Margarita Ranch, near Ysidora, April 23, 1903, *Abrams 3307* (F, M); San Diego, Sept. 3, 1904, *Berg* (Calif); Coronado, Nov. 3, 1904, *Berg* (Calif); San Diego, March 1906, *Brandegee* (F), Oct. 1906 (Calif); San Clemente Island, Aug. 25, 1894, *Brandegee* (Calif, US); San Diego, March 10 and April 27, 1902, *Brandegee 818* (Calif, F, M, ND); near Las Flores, Feb. 5, 1933, *Bright & Wyman 8005* (US); old clearing, La Jolla, Feb. 23, 1914, *Clements 188* (F, M); San Diego, 1875, *Cleveland* (G, M photo.); Pacific Beach, near San Diego, June 19, 1915, *Collins & Kempton 192* (US); San Diego, March 12, 1891, *Dunn* (Calif); dunes at the Boundary Monument south of San Diego, Nov. 3, 1880, *Engelmann* (M); Point Loma, near San Diego, Nov. 6, 1880, *Engelmann* (M); Torrey Pines Reservation, alt. 50 m., April 10, 1924, *Fleming & Eggleston 19684* (M); San Diego, Nov. 1879, *James 1* (US); San Diego, March 9, 1882, *Jones 3046* (M); San Marcos, Feb. 1931, *Klensmith* (Calif); San Diego, *Nuttall* (G **type**, M photo.); Mission Cañons, San Diego, April 30, 1883, *Orcutt*, and Feb. 10, 1884 (F); San Diego, Feb. 23, 1885, *Orcutt 178* (ND), *1421* (M); San Diego, coll. of 1875, *Palmer 47* (F, G, M); La Jolla, alt. 25 ft., Dec. 15, 1928, *Parks 328* (Calif, M, US); San Diego, May 1852, *Thurber 562* (F, M); San Clemente Island, Oct. 1896, *Trask* (ND); San Clemente Island, Oct. 1902, *Trask 53* (US), *54* (US); near Torrey Pines Park, June 17, 1928, *Wiggins 3285* (Calif); near San Diego, *Wright 33* (Calif); near Pelican Bay, Santa Cruz Island, April 26, 1930, *Abrams & Wiggins 80* (Calif); Santa Ynez Mountains, Santa Barbara, 1888, *Brandegee* (Calif); Santa Cruz Island, April 1888, *Brandegee* (Calif); Pelican Bay, Santa Cruz Island, alt. 15 m., June 10, 1930, *Clokey 4994* (Calif); near Santa Barbara, May 16, 1908, *Eastwood 133* (Calif, F, M); Concepcion to Jalama, alt. 30 m., March 29, 1924, *Eggleston 19580* (US); Santa Barbara, May 1902, *Elmer 3898* (F, M, US); Santa Barbara, March 1884, *Green* (F); Santa Barbara, *Nuttall* (G type of *Styphonia serrata*, M photo.); Santa Barbara, May 26, 1906, *Roadhouse* (Calif); southeastern part of Ventura Co., alt. 15 m., March 1929, *Clokey & Templeton 4605* (Calif, M, US); Oxnard, 1901, *Davy 7809* (Calif).

MEXICO:

LOWER CALIFORNIA: March–June 1897, *318A* (M); Rosario, May 20, 1889, *Brandegee* (Calif); Canyon of Rio Antonio, between San Vicente and Johnston's ranch, March 1, 1934, *Ferris 8513* (NY); just south of San Vicente on road to Johnston's ranch, March 1, 1934, *Ferris 8514* (NY); San Quentin, 1841, *Hinds* (K type of *R. Hindsiana*, M photo.); Ensenada, April 7, 1921, *Johnston 3011* (CA); Tia Juana, Dec. 29, 1922, *Nelson 10033* (Calif); Santo Tomas, May 31, 1889, *Pond* (Calif); Ensenada, alt. 100 ft., Sept. 5, 1912, *Smith 5330* (F, M, US); 2 miles south of "Halfway House," 37 miles south of Tia Juana, Sept. 8, 1929, *Wiggins & Gillespie 3905* (F, M, US); CEDROS ISLAND:—Aug. 10, 1896, *Anthony* (Calif); summit of ridge, June 6, 1925, *Mason 2034* (CA, US); March 18–20, 1889, *Palmer 735* (US).

20a. **Rhus integrifolia** var. **cedrosensis** Barkl., n. var.[1] Pl. 20, fig. 1.

Small tree; leaves simple, ovate, subacute; inflorescence a spicate thyrsus, bracts ovate, mostly deciduous.

MEXICO:

LOWER CALIFORNIA: Cedros Island: June 6, 1925, *Mason 2039* (CA); March 11, 1911, *Rose 16134* (NY **type**, M photo, US).

21. **Rhus Kearneyi** Barkl., n. sp.[2] Pl. 19, fig. 2.

Small tree; new branches gray or tan, minutely puberulent, the older glabrate; leaves oblong-elliptic to oval, 2.5–5 cm.

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[1] **Rhus integrifolia** var. **cedrosensis** Barkley, n. var. Arbuscula; foliis simplicibus ovatis subacutis; floribus multis in spicis plus minusve diffusis compositis; bracteis bracteolisque plus minusve deciduis—Collected on Cedros Island, Lower California, Mexico, March 11, 1911, *Rose 16134* (NY **type**).

[2] **Rhus Kearneyi** Barkley, n. sp. Arbuscula; foliis breve-petiolatis simplicibus glabratis integris oblongo-ellipticis vel ovatis circiter 5 cm. longis 3.5 cm. latis subacutis subcordatis; inflorescentiis terminalibus in spicis compositis parvis densis, bracteis bracteolisque ciliatis persistentibus; floribus circiter 5 mm. longis, sepalis ciliatis.—Collected in Tinajas Altas Mountains, Yuma Co., Arizona, March 29, 1930, *Harrison & Kearney 6573* (US **type**).

long, 1.5–3.5 cm. broad, coriaceous, entire, revolute-margined, glabrous except for a few glandular hairs, apex rounded to subacute, base subcordate to cordate; petioles short, 3–9 mm. long; inflorescence a small, dense, terminal, compound spike, bracts deltoid-ovate, subacute, densely pilose on both surfaces, a few glandular hairs on the outer surface, ciliate with simple hairs, persistent; sepals broadly deltoid, 2 mm. long, 2.5 mm. broad, ciliate with simple hairs, slightly pubescent on the outer surface, glabrous on the inner surface, persistent; petals rhombic ovate, 3.5 mm. long, 2 mm. broad, slightly pilose at the base on the outer surface; anthers oval, 1.5 mm. long; filaments 1 mm. long; fruit red, oblong, constricted at the ends, laterally compressed, 10 mm. long, 9 mm. broad, pubescent with simple and glandular hairs.

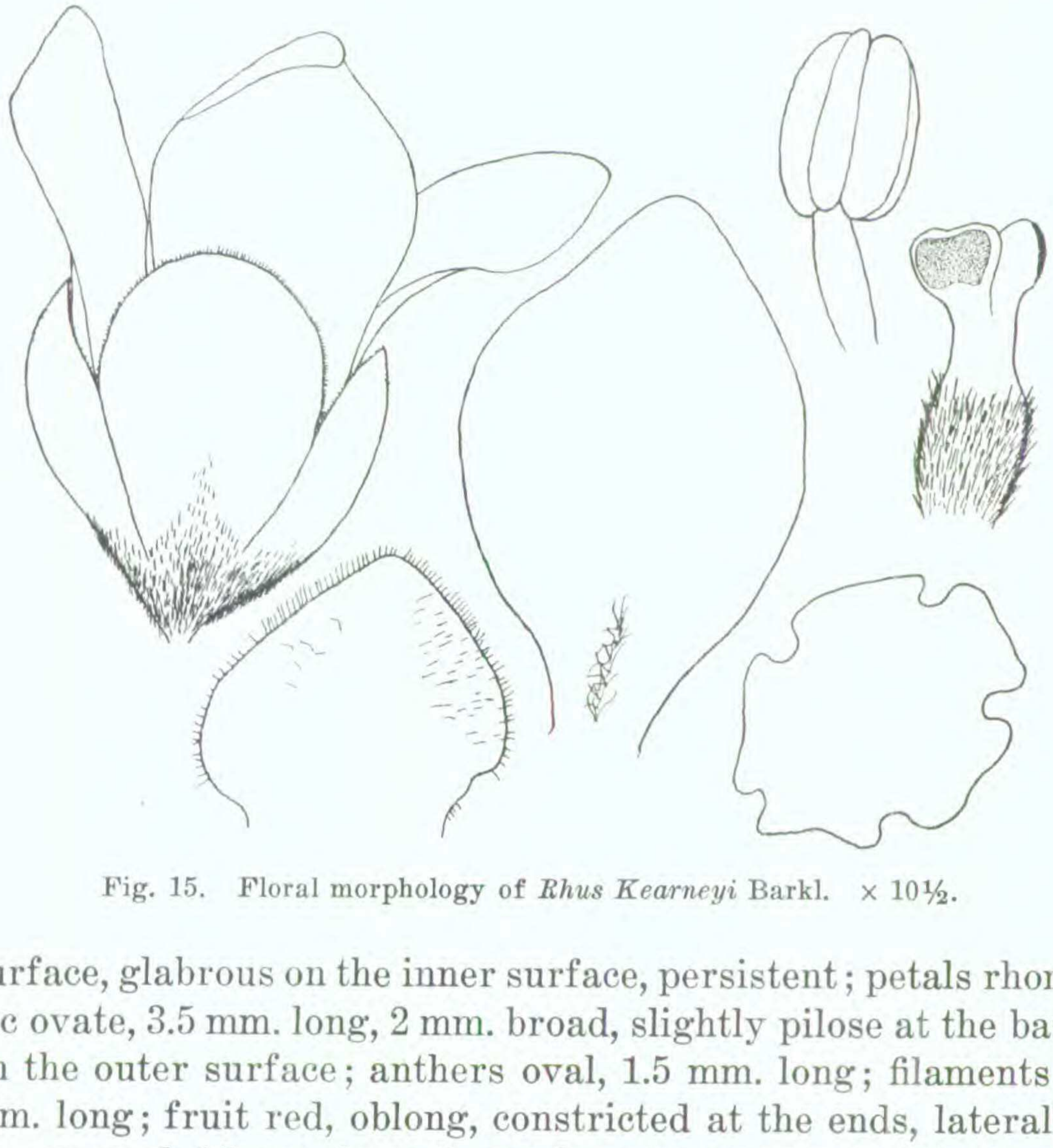

Fig. 15. Floral morphology of *Rhus Kearneyi* Barkl. × 10½.

This interesting new species from the Tinajas Altas is apparently quite distinct. It is named in honor of Dr. T. H. Kearney, Bureau of Plant Industry, Washington, D. C. Its morphological relationships seem to be closest to *Rhus Standleyi* and *R. ovata.* It may be most easily distinguished from *R. ovata* by its oblong, short-petioled leaves which do not tend to fold along the midrib. Compared to *R. Standleyi* its leaves are much heavier and are glabrous.

Distribution: southern Arizona (fig. 13).

UNITED STATES:

ARIZONA: Tinajas Altas Mts., Nov. 20, 1913, *Goldman 2311* (US); Tinajas Altas Mts., March 29, 1930, *Harrison & Kearney 6573* (M, US **type**).

22. **Rhus ovata** Wats., Proc., Am. Acad. **20**: 358. 1885.

Rhus integrifolia Engler in DC., Monogr. Phaner. **4**: 388. 1883, in part.

Neostyphonia ovata Abrams, Bull. N. Y. Bot. Gard. **6**: 403. 1910.

Shrub or small tree, 1–10 m. high; branches chocolate-brown, at first puberulent, soon glabrate; leaves simple or rarely trifoliolate and then often imperfectly so, ovate-elliptic to broadly ovate, 5–8.5 cm. long, 3.5–5.5 cm. broad, coriaceous, glabrous, somewhat acuminate, acute, base cuneate to obtuse, margin usually entire and wavy, but often regularly or irregularly repand-serrate, subrevolute, the upper surface smooth, mottled green, darker than the lower surface; petioles purplish, usually 1.5–2 cm. long, stoutish, essentially glabrous; inflorescence a large, dense, terminal compound spike about 5 cm. long, 4.5 cm. broad, bracts ovate, 1.5 mm. long, 2 mm. broad, rose-colored, rounded at the apex, sparsely pubescent, glabrous on the inner surface, margin ciliate with non-glandular hairs; sepals oval, 2.5 mm. long, 2.5 mm. broad, rounded at the apex, glabrous except for the non-glandularly ciliate margin and outside at the base; petals broadly ovate, 5 mm. long, 2 mm. broad, glabrous on the outer surface, sparsely pilose at the base of the midrib on the inner surface, margin ciliate; anthers about 0.7 mm. broad, about twice as long; filaments slightly longer than the sepals.

While this species has larger, longer-petiolate leaves and smaller fruits than *Rhus integrifolia* and while the leaves are acute and tend to fold along the midrib, there is such similarity between the two species that they were for many years confused and both treated under the name *Rhus integrifolia.* Like that species, the leaves of *R. ovata* vary greatly in size, shape, and margin. In the Santa Monica Mountains and on Santa Catalina Island, they are often more or less trifoliolate. In the coastal regions of California they tend to be elliptic and cuneate at the base, while over the inland areas they tend to become broadly ovate and obtuse at the base. The variety of this species has shorter petioles and glandular-ciliate bracts and sepals. Further study may show this to be a hybrid between the species and *Rhus integrifolia.*

Distribution: central Arizona to southern California and northern Lower California (fig. 13).

UNITED STATES:

ARIZONA: Packard to Payson, Nov. 1, 1928, *Eastwood 16614* (CA); Prescott to Phoenix, Nov. 9, 1928, *Eastwood 16786* (CA); Prescott to Phoenix, Nov. 6, 1928, *McKelvey 346* (US); Tetso and Gila Rivers, April 27, 1867, *Palmer 36* (M), 1869 (US); Globe, Nov. 5, 1913, *Bailey* (US); Collom Camp, Mazatzal Mts., alt. 1200 m., *Collom 297* (M); Roosevelt to Payson, Oct. 25, 1928, *Eastwood 15843* (CA); Pinal Mts., from Globe to Clifton, Oct. 26, 1928, *Eastwood 15883* (CA); Superior-Miami road, *Kearney & Peebles 9248* (Calif); Gila Co., Aug. 31, 1935, *Little 4057* (ND); 18 miles from Globe on road to Roosevelt Reservoir, July 3, 1928, *Wolf 2481* (CA); Fish Creek, Apache Trail, May 19, 1919, *Eastwood 8776* (CA); Apache Trail, summit of Fish Creek Hill, April 2, 1932, *Gillespie* (US); *5573* (Calif); Fish Creek, June 14, 1916, *Jackson 29* (US); Aquarius Mts., May 14, 1931, *Eastwood 18373* (CA); Prescott Forest, June 19, 1921, *Jones* (Calif); Pine Creek, near Camp Verde, Aug. 26, 1891, *McDougal 669* (US), French Gulch, Senator Range, March 10, 1915, *Ruddock* (CA).

CALIFORNIA: southwest California, May 1901, *Grant 2443* (US); City Creek, Feb. 3, 1904, *Kellogg* (US); Coast Hills, Sierra Valley, May, 187?, *Lemmon 82* (F); Mountain Spring, eastern base of Coast Range, May 8, 1894, *Mearns* (US); foothills of the San Bernardino Mts., March 1881, *Parish 705* in part (Calif), April 1, 1888, *2018* (F); southern California, 1876, *Parry & Lemmon 42* (F); Coyote Canyon, Los Corotes, western borders of the Colorado Desert, April 1902, *Hall 2828* (Calif); east of Whitewater Ranch in dry wash of Colorado Desert, April 14, 1922, *Munz & Keck 5004* (Calif); near the ''ridge road,'' west of Bakersfield, May 8, 1933, *Nelson 545* (M); Sepulveda Canyon, Santa Monica Mts., June 17, 1902, *Abrams 2559* (F, M); Santa Monica Mts., May 30, 1930, *Anderson & Epling* (Calif, M, US); hills near Monrovia, April 3, 1903, *Baker 4147* (Calif, F, M); Santa Monica Canyon, winter 1897, *Barber 311* (Calif); Wilson Trail, alt. 1400 ft., Mt. Wilson, Aug. 31, 1910, *Blake 824* (F); Pasadena, May 1890, *Brandegee* (Calif); Sherman, May 27, 1902, *Braunton 360* (US); Claremont, May 1912, *Burnell* (M); alluvial bottom, Santa Monica Mts., alt. 200 m., April 1929, *Clokey & Templeton 4431* (Calif, M, US); hillsides, Santa Monica Mts., March 29, 1916, *Crawford & Hiatt* (M); Topanga Canyon, May 8, 1926, *Epling* (M); Topanga Canyon, Santa Monica Mts., May 18, 1929, *Epling & Ellison* (Calif, M, US); above Calabasas, Santa Monica Mts., alt. 1200 ft., May 16, 1931, *Ewan 4203* (M); Santa Monica, June 1890, *Hasse*, June 1891 (M), and June 5, 1891 (US); Eagle Rock, April 23, 1912, *Smith 4812* (F); SANTA CATALINA ISLAND:—May 1890, *Brandegee* (Calif); Silver Canyon, May 29, 1936, *Nuttall 281* (F); Avalon, Sept. 1896, *Trask* (M), April 1897 (US), Aug. 1897 (M), Nov. 1897 (US), 1898 (CA, M), March 1898 (M), March 1898, *92* (F, US), coll. of 1898, *414* (F), March *1901* (US), *39, 415, 435* (F), March 1901 (M), May 1901, *413* (F), and March 1911 (M);—Santa Ysabel, April 2, 1893, *Henshaw 191* (US); 1.5 miles below Trabuco Camp Grounds, Trabuco Canyon, west slope of Santa Ana Mts., March 6, 1931, *Wolf (1857)* (Calif); Nuevo, April–June 1894, *Brandegee* (Calif); 2 miles east of Pinyon Flat, Santa Rosa Mts., alt. 3500 ft., July 3, 1933, *Duran 3498* (Calif, M); Temescal, April 9, 1898, *Hall 875* (Calif); east slope of San Jacinto Mts., alt. 800 m., March 22, 1898, *Leiberg 3162* (US); Glen Ivy, May 18, 1932, *Munz & Johnson 5327* (Calif); Asbestos Mountain, at side of Santa Rosa Mountain, alt. 4400 ft., Oct. 8, 1912, *Smith 5479* (F); Idyllwild, San Jacinto Mts., alt. 5000 ft., Aug. 1925, *Spencer 287* (Calif); Banning, Sept. 27, 1894, *Toumey* (Calif); Morongo Pass, near Riverside County line, alt. 500 ft., March 3, 1929, *Braunton 1026* (Calif); between San Bernardino and Martin's ranch on the road to Cajon Pass, alt. 400 m., Jan. 3, 1911, *Coville & Funston 110* (US); Mission Creek, March 8, 1930, *Jones 26543* (M); Reche Canyon, April 1, 1888, *Parish 2018* (Calif, M); foothills at Redlands, April 20, 1891, *Parish 2202* (US); Waterman Canyon, San Bernardino Mts., alt. 2500 ft., June 29, 1894, *Parish 3490* (M, US); near San Bernardino, alt. 1000–1500 ft., April 5, 1895, *Parish 3631* (Calif, ND); Reche Canyon, San Bernardino Valley, alt. 360–400 m., March 13, 1908, *Parish 6802* (Calif, F); dry mesas, near base of mountains, San Bernardino Valley, alt. 300 m., June 8, 1917, *Parish 11336* (Calif); foothills, San Bernardino, March 1881, *Parish 705* (US); hills, Campo Creek, between Campo and Potrero, June 3, 1903, *Abrams 3719* (M, US); Twinoak, June 11, 1900, *Bailey 304* (US); coll. of 1898, *Barrows* (Calif); mountains of San Diego, *Brandegee* (Calif); Ramona, May 29, 1894, *Brandegee* (Calif); near Banner, April 1898, *Brandegee* (Calif); Warner Springs, April 9, 1913, *Eastwood 2160* (US); Fall Brook, March 28, 1882, *Jones* (US), *3318* (M); Mountain Spring, May 10, 1894, *Mearns 2987*, and May 14, 1894, *3148* (US); summit of Wagon Pass, Coast Range, May 15, 1894, *Mearns 3200* (US); San Felipe Valley, April 15, 1927, *Meyer 80* (Calif); Mission Canyons, San Diego, April 30, 1883, *Orcutt* (F), *98* (M); San Diego, April 23, 1885, *Orcutt* (US); Pala, April 1881, *Parish 551* (F); Jacumba Hot Springs, near Monument 233, May 17, 1894, *Schoenfeldt 3234*, and May 24, 1894, *3264* (US); near San Diego, alt. 1900 ft., April 8, 1916, *Spencer 137* (Calif, US); San Diego, coll. of 1922, *Woodcock* (F); in Santa Ynez Mts., near Santa Barbara, 1888, *Brandegee* (Calif); Santa Cruz Island, April 1888, *Brandegee* (Calif); Santa Barbara, coll. of 1891, *Dunn* (Calif); Painted Cave Ranch, near Santa Barbara, May 9, 1908, *Eastwood 78* (Calif, F, M, US); Santa Ynez Mts., near Santa Barbara, Aug. 1902, *Elmer 3904* (F, M, US); Santa Cruz Island, July and Aug. 1886, *Greene* (F, ND).

MEXICO:

LOWER CALIFORNIA: San Pedro Martin, May 6, 1893, *Brandegee* (Calif); road from Mexicali to Tiajuana, alt. 3000 ft., March 1932, *Cota* (Calif); La Huerta, at the west base of Hanson Laguna Mts., alt. 2800 ft., June 2, 1905, *Goldman 1120* (US); mountains, Sept. 11, 1884, *Orcutt* (Calif); Palm Valley, northern Lower California, April 8, 1885, *Orcutt 137* (ND); near Santo Tomas, July 15, 1885, *Orcutt 1425*, April 12, 1886, and *1423* (M); Nochoguero Valley, June 4, 1894, *Schoenfeldt 3430* (US).

22a. **Rhus ovata** var. **Traskiae** Barkl. n. var.[1] Pl. 20, fig. 2.

Small tree, 3–6 m. high; branches brown, at first puberulent, soon glabrate; leaves simple, ovate to ovate-elliptic, bluntly acute, bluntly cuneate at base, upper surface dull-glaucescent, yellowish beneath; bracts of the inflorescence broadly ovate, densely pubescent at the base on the outer surface, ciliate with simple and glandular hairs.

UNITED STATES:

CALIFORNIA: Avalon, Santa Catalina Island, April 1897, *Trask* (US), March 1898 (M **type**, US).

Section PSEUDOSCHMALTZIA Barkley, n. sect.

Shrubs or small trees, with branches at first covered with a gray or yellow-gray puberulence or pilosity. Flowers many, whitish, typically in stout, lateral, compound spikes shorter than the subtending leaves, often also with a terminal inflorescence, polygamo-dioecious, sessile and subtended by a bract and two bracteoles; bracts and bracteoles deltoid-lanceolate or broadly ovate and persistent. Drupes red or orange, somewhat flattened; seed bony, oval, flattened, smooth. Leaves alternate, imparipinnate with 3–15 persistent leaflets; leaflets more or less subcoriaceous, revolute or not, glabrous, glaucous, or pubescent, often smooth and shining above, but sometimes dull; rachis and petiole usually stout, in most species not winged, lateral leaflets usually short-petiolulate.

Texas to Arizona, south to Guatemala (fig. 16).

Type species: **Rhus virens** Lindh., Bost. Jour. Nat. Hist. [Pl. Lindh. II] **6**: 159. 1850.

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[1] **Rhus ovata** var. **Traskiae** Barkley, n. var. Arbuscula 3–6 m. alta; foliis simplicibus breve-petiolatis ovatis vel ovato-ellipticis subacutis supra subglaucis infra flavo-viridibus; bracteis late ovatis ciliatis cum pubescentia simplici et glandulifera. —Collected at Avalon, Santa Catalina Island, California, March 1898, *Trask* (M **type**).

PSEUDOSCHMALTZIA is a group of easily definable species, which are mostly shrubs having imparipinnate, evergreen leaves, and stout, either terminal or lateral, compound spikes. There seems to be a well-marked relationship between this group and STYPHONIA.

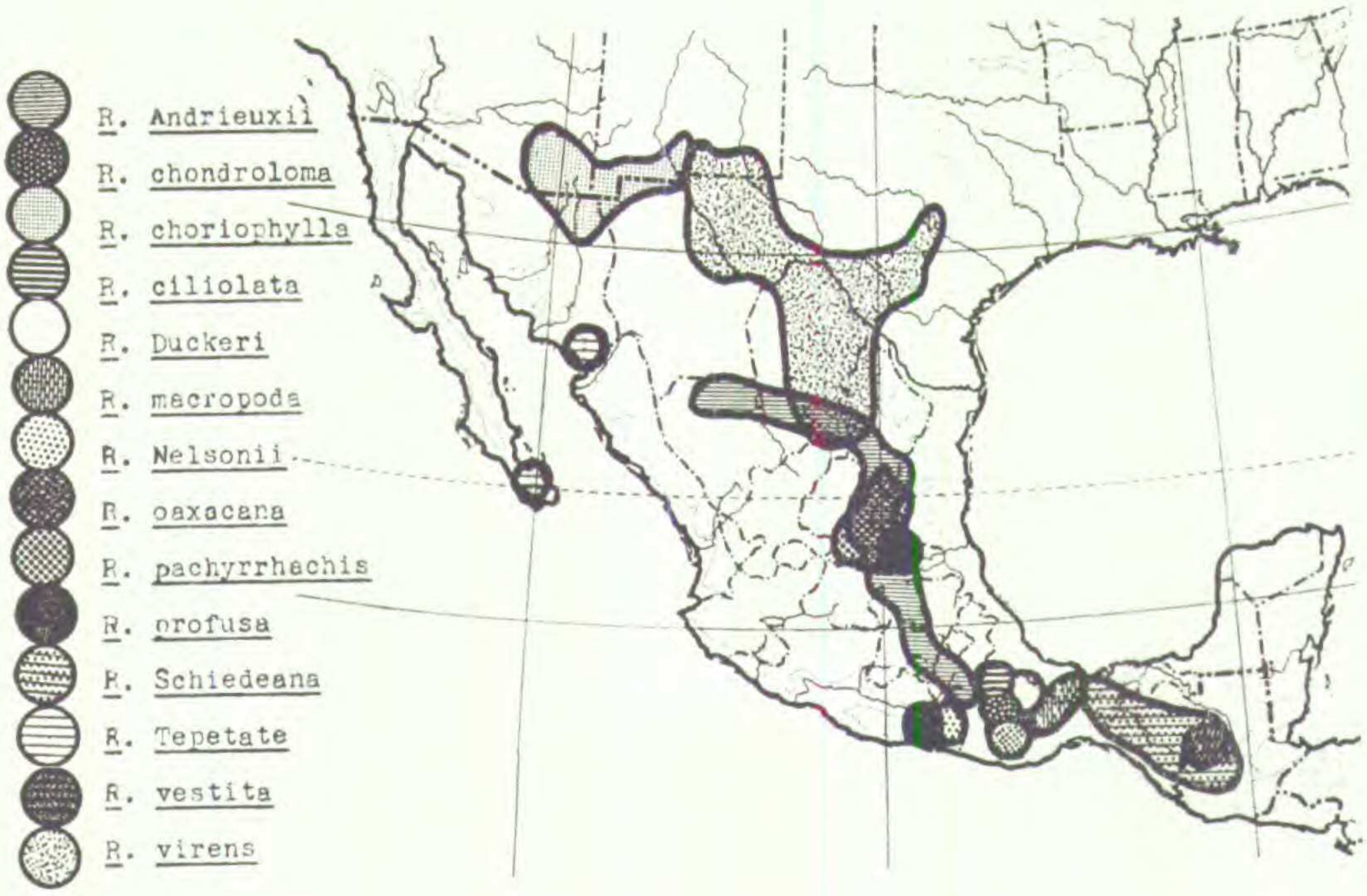
R. Andrieuxii
R. chondroloma
R. choriophylla
R. ciliolata
R. Duckeri
R. macropoda
R. Nelsonii
R. oaxacana
R. pachyrrhachis
R. profusa
R. Schiedeana
R. Tepetate
R. vestita
R. virens

Fig. 16. The geographic distribution of the species in Section PSEUDOSCHMALTZIA.

KEY TO SPECIES AND VARIETIES

Rachis narrowly winged; leaflets usually 3–5, terminal usually much larger than lateral ones.
  Stems and leaves glabrous; leaflets mostly obovate, abruptly truncate...... ....*23. R. chondroloma*
  Stems and leaves with a dense spreading pubescence; leaflets mostly ovate, rounded...*24. R. Duckeri*
Rachis not winged; leaflets 3–13, terminal usually smaller than lateral ones.
  Stems and upper leaf surfaces, at least in the early stages, with a dense spreading pubescence.
    Leaflets mostly oblong, not strongly acuminate.
      Upper leaf surface dull green; from northeastern Mexico............ ....*25. R. pachyrrhachis*
      Upper leaf surface lustrous; from Chiapas and Guatemala.
        Pubescence on upper surface of leaflets confined to the veins........ ....*26. R. vestita*
        Pubescence on upper surface of leaflets not confined to the veins.... ....*26a. R. vestita* var. *Ghiesbreghtii*

Leaflets lanceolate to ovate-lanceolate, strongly acuminate.

Pubescence on upper leaf surface soft and diffuse; inflorescence about 10 cm. long.......................................*27. R. Nelsonii*

Pubescence on upper leaf surface not soft, mostly confined to the veins; inflorescence about 5 cm. long........................*28. R. oaxacana*

Stems and upper leaf surfaces glabrous or puberulent, rarely glaucous.

Lateral leaflets 4 cm. long or less; branches relatively slender; leaflets sparsely pubescent or glabrous beneath.

Leaflets sparsely pubescent below, soft to the touch; inflorescences few, usually terminating the branches.......................*29. R. virens*

Leaflets glabrous, not soft to the touch; inflorescences usually numerous, both axillary and terminal.

Leaflets 3–5, ovate to ovate-lanceolate, mostly more than 3 cm. long, subacuminate, not distinctly shining above, terminal leaflets usually slightly larger than lateral ones; range mostly limited to Arizona and New Mexico......................*30. R. choriophylla*

Leaflets 5–13, ovate, mostly less than 3 cm. long, acute, distinctly shining above, terminal leaflets usually not larger than lateral ones; Mexico................................*31. R. Andrieuxii*

Lateral leaflets more than 4 cm. long; branches relatively stout; leaflets sparsely puberulent or glabrous beneath.

Leaflets sessile or very short-petiolulate, subacute to acute.

Leaflets ovate-lanceolate, mostly reddish above, apex subacute, base rounded or cuneate, slightly oblique; southern Mexico and Guatemala...*32. R. Schiedeana*

Leaflets oblong-ovate or oblong-obovate, green above, apex obtusish or abruptly acute, base subcuneate, lowermost subcordate, oblique; northern Mexico: Sonora and Lower California..*33. R. Tepetate*

Leaflets petiolulate, acuminate or subacuminate.

Inflorescence axillary; leaflets usually 5, acuminate; reticulum of small veins obscure............................*34. R. macropoda*

Inflorescences terminal and axillary; leaflets usually 3 or 9, long-acuminate, reticulum of small veins conspicuous.

Leaflets usually 3, mostly ovate.......................*35. R. ciliolata*

Leaflets usually 9, mostly lanceolate..................*36. R. profusa*

23. **Rhus chondroloma** Standl., Field Mus. Bot. Ser. **11:** 164. 1936.

Branches dark brown, minutely cinereous-puberulent; leaflets 3–7, coriaceous, shining on both surfaces, subrevolute and distinctly white-corneous margined, entire, at first inconspicuously glaucous-puberulent above and minutely pubescent below, later glabrate on both surfaces, bluish-gray above, paler below, conspicuously pallid-veined, subtruncate to emarginate at apex, cuneate to rounded at base, terminal leaflets distinctly obovate to obcordate, decurrently long-subpetiolulate, 1.7–4 cm. long, 2–3 cm. broad, lateral leaflets elliptic-ovate, sessile or subsessile, 1.5–4 cm. long, 1–2.5 cm. broad; petioles 1–2.5 cm. long, wingless, subterete, minutely puberulent or glabrate, rachis segments 1–2.5 cm. long, stout, often narrowly winged; inflorescence a terminal, small, compound spike about 4 cm. long and broad, bracts ovate-deltoid, 1 mm. long, 1.5 mm. broad, with simple and glandular hairs on the outer surface, glabrous on the inner surface, ciliate with long simple hairs; sepals rotund, 1.2 mm. in diameter, glabrous, not ciliate; petals in the dried state whitish, oval, 2 mm. long, 1.3 mm. broad, glabrous, not ciliate; filaments shorter than sepals; anthers rectangular, 0.75 mm. broad, about as long; styles 3, more or less distinct.

It seems incredible that such a well-marked species should have remained in herbaria undescribed for thirty years. The obovate, coriaceous leaflets with their shining surface and whitened margin make the species distinctive. In some respects it stands intermediate between sections PSEUDOSCHMALTZIA and STYPHONIA.

Distribution: Puebla (fig. 16).
MEXICO:
PUEBLA: Tehuacan, June 1905, *Purpus 1290* (Calif, F **type**, M, NY); El Riego, June 1912, *Purpus 5838* (Calif).

24. Rhus Duckeri Barkl., n. sp.[1] Pl. 21.

A shrub with branches at first maroon-colored, covered with a dense gray tomentum and numerous maroon-colored lenticels; leaflets usually 3–5, oval or obovate, submucronate at the apex, rounded or subcuneate at the base, thin-coriaceous, subrevolute, entire-margined, soft-pubescent above and below, dark and shining above, lighter and dull below, terminal leaf-

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[1] **Rhus Duckeri** Barkley, n. sp. Arbuscula; foliis imparipinnatis, foliolis 3–5 ovalibus vel obovatis circiter 5 cm. longis 3 cm. latis utrinque molliter et dense tomentosis submucronatis subcoriaceis integris, marginibus non revolutis, foliolis terminalibus plerumque maioribus quam foliolis lateralibus, rhachide alato; floribus in spicis terminalibus compositis dispositis, bracteis bracteolisque ciliolatis et persistentibus.—Collected at Cuesta de Ejutla, Nacaltepec, Oaxaca, Mexico, alt. 6000 ft., April 6, 1895, *L. C. Smith 464* (US **type**).

lets 1.5–7.5 cm. long, 1.2–5 cm. broad; with petioles 0.6–2 cm. long, lateral leaflets 1.5–6 cm. long, 1.2–3.5 cm. broad, sessile, petioles 1.5–2 cm. long, rachis segments 1.5–2.5 cm. long, winged, stout; inflorescences terminal and lateral compound spikes, bracts deltoid, acutish, about 2 mm. long, 1.5 mm. broad, brownish, densely pubescent on the outer surface with simple and glandular hairs, slightly pubescent on the inner surface, persistent; sepals subrotund, about 1.5 mm. long, almost as broad, with a few hairs at the base of the outer surface, glabrous on the inner surface, ciliate with simple and glandular hairs; petals tan in the dried state, obovate-rotund, about 2 mm. broad, 3 mm. long, glabrous on both surfaces, not ciliate; filaments as long as the sepals; anthers oval, about 0.8 mm. broad, slightly shorter; fruit red, with glandular and simple pubescence.

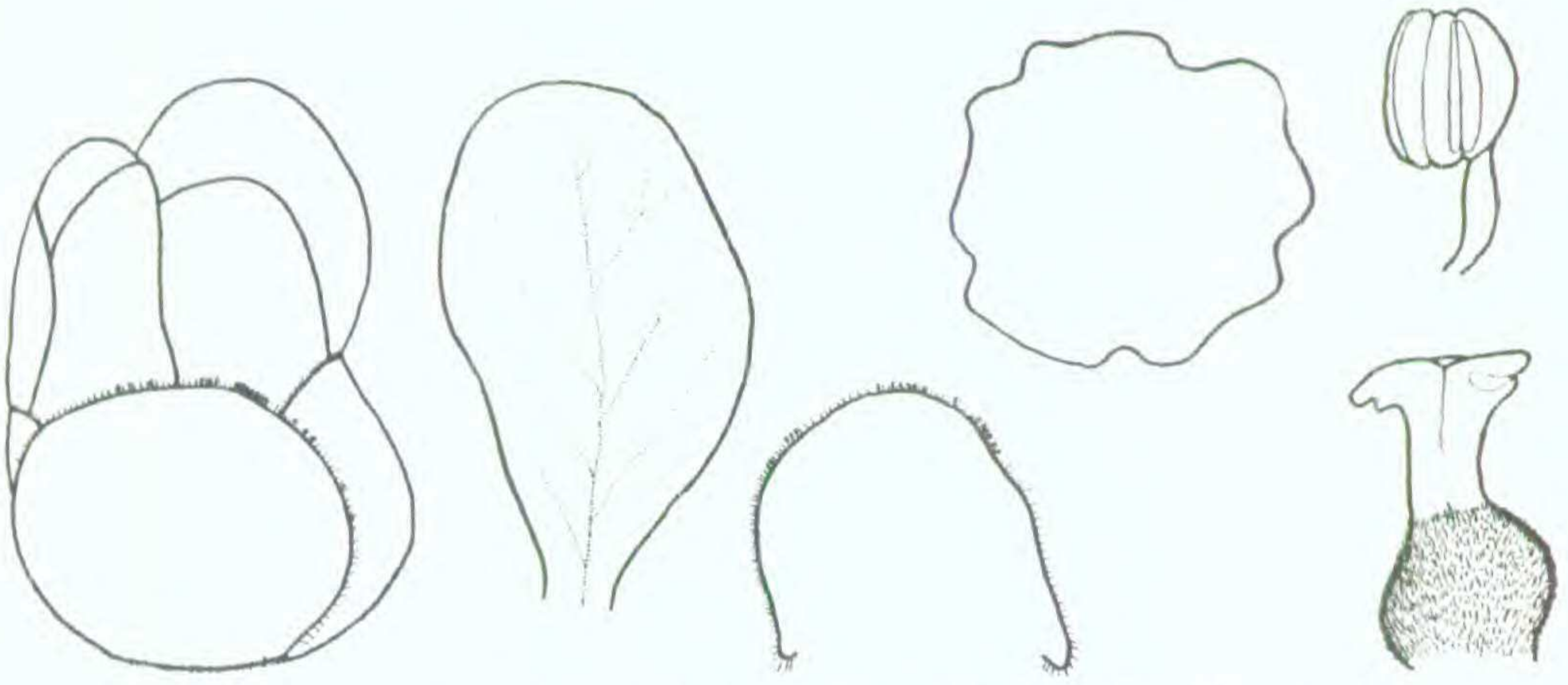
Fig. 17. Floral morphology of *Rhus Duckeri* Barkl. × 10½.

While the type of this very distinctive species was collected over forty years ago, it has apparently remained undescribed. It is evidently a coarse shrub having thick, puberulent leaflets with prominently whitened margins. The plant is densely canescent. It is named in honor of the author's wife, née Elizabeth Anne Ducker.

Distribution: Oaxaca (fig. 16).

MEXICO:

OAXACA: Cuesta de Ejutla, Nacaltepec, alt. 6000 ft., April 6, 1895, *Smith 464* (F, US **type**, M photo.).

25. Rhus pachyrrhachis Hemsl., Biol. Cent.-Am. Bot. **1**: 218. 1880, excl. specim. *Ghiesbreght 511;* Diagn. Pl. Nov., pt. 3, p. 1. 1880, excl. specim. *Ghiesbreght 511.*

Rhus Schiedeana Schlecht. ex Engler in DC., Monogr. Phaner. **4**: 391. 1883, in part.

Branches maroon-brown, covered with a yellow-gray tomentum; leaflets 9–13, lanceolate to elliptical, obcordate to obtuse at the base, rounded or acute at apex, revolute and strongly inrolled at the margin, entire, dull green and soft villous-pubescent on both surfaces, glandularly pubescent below, terminal leaflet 2–3 cm. long, 0.7–1.5 cm. broad, lateral leaflets 2–3 cm. long, 2.5–5 cm. broad, coriaceous, petiolules 0–3 mm. long; petioles about 1.5 cm. long, rachis segments about 1–1.5 cm. long, stout; inflorescence in lateral compound spikes 5 cm. long, 3 cm. broad, bracts broadly ovate, 2.5 mm. long, 2 mm. broad, rounded at the apex, brownish, densely pubescent on the outer surface, glabrous on the inner surface, ciliate with simple and glandular hairs, persistent; sepals subrotund, about 2.5 mm. long, 1.7 mm. broad, glabrous except on the outer surface near the base, ciliate with simple and glandular hairs; petals brownish in the dried state, ovate to rhombic-ovate, about 2.5 mm. long, 1.75 mm. broad, glabrous on the outer and inner surfaces, not ciliate; filaments shorter than the sepals; anthers rectangular, 0.8 mm. long, about as broad; fruit red, about 7 mm. long, 8 mm. broad, pubescent with simple and glandular hairs.

This is a densely pubescent species of northeastern Mexico. Its affinities seem to be with *Rhus virens* and *R. vestita.* The leaflets are thin and strongly reflexed.

Distribution: Nuevo Leon, San Luis Potosi, and Tamaulipas (fig. 16).

MEXICO:

NUEVO LEON: Hacienda Pablillo, Galeana, Aug. 11, 1936, *Taylor 71* (F).

SAN LUIS POTOSI: Alvarez, Sept. 5–10, 1902, *Palmer 61* (F, G, M, NY); 220° N. lat., alt. 6000–8000 ft., 1878–1879, *Parry & Palmer 125* (F, G, Kew **type**, M, PA); Minas de San Rafael, Nov. 1910, *Purpus 4922* (Calif, F, G, M); in the San Miguelito Mts., coll. of 1876, *Schaffner 95* (G), coll. of 1879, *455* (CA, F, NY), *908* (G, NY).

TAMAULIPAS: sierra near Jaumave, 1932, *von Rozynski 505* (F).

26. Rhus vestita Loesen., Bull. Herb. Boiss. II. **6**: 835. 1906.

Rhus Schiedeana forma *vestita* Radlk. ex Smith, Enum. Pl. Guatemal., pt. 3, p. 22. 1893.

R. Succedaneum Sessé & Moc., Pl. Nov. Hisp., p. 47. 1887, non *R. succedanea* L., Mant. **2**: 221. 1767.

Shrubs; branches maroon-brown with a yellow-gray tomentum; leaflets 7–9, elliptic, acute, obtuse at the base, coriaceous, subrevolute-margined, entire, pubescent on the veins above and below, somewhat glandularly pubescent below, shining above, dull beneath, terminal leaflets 3–3.5 cm. long, 1.5–2 cm. broad, lateral leaflets 3–4.5 cm. long, 2–2.5 cm. broad, petiolules about 4 mm. long; petioles about 2 cm. long, rachis segments about 2 cm. long, stout; inflorescence a terminal compound spike, 10 cm. long, nearly as broad, bracts broadly ovate, 2 mm. long, about as broad, rounded to subacute, brownish, densely pubescent on the outer surface, glabrous on the inner surface, persistent; sepals subrotund, about 2.25 mm. long, 1.75 mm. broad, glabrous except on the outer surface near the base, ciliate with simple and glandular hairs; petals brownish in the dried state, rhombic-ovate, about 3 mm. long, 2 mm. broad, glabrous on both surfaces, not ciliate; filaments slightly shorter than the sepals; anthers rectangular, 0.8 mm. long, about as broad.

This species has few leaflets, which are coriaceous and have scarcely revolute margins. While its variety (see below) is intermediate in several respects between it and *Rhus pachyrrhachis*, with which it has been confused, its affinities seem undoubtedly to be with *Rhus vestita;* from the latter it differs most markedly in the revolute margins of the leaflets and in the general distribution of pubescence.

Distribution: southern Mexico and Guatemala (fig. 16).

MEXICO: without definite locality, coll. of 1787–1804, *Sessé, Mociño, Castillo & Maldonado 854* (Madrid), *4941* (F, Madrid).

CENTRAL AMERICA:

GUATEMALA: HUEHUETENANGO: Los Hingis above Chiantla, May 29, 1906, *Cook 43* (US); QUICHE: San Siguam, alt. 5800 ft., April 1892, *Heyde & Lux (Donnell Smith 3032)* (G, M, US, **cotypes**).

26a. Rhus vestita var. **Ghiesbreghtii** Barkl., n. var.[1]

Rhus pachyrrhachis Hemsl. ex Engler in DC., Monogr. Phaner. **4**: 391. 1883, in part.

R. sempervirens var. *pachyrrhachis* Engler, *ibid.* 1883, excl. syn.

R. Schiedeana Schlecht. ex Engler, *ibid.*, as to specim. *Ghiesbreght 511.*

Leaflets large, pubescence of leaflets not confined to the veins.

MEXICO:

CHIAPAS: Teopisca, coll. of 1864–1873, *Ghiesbreght 511* (Kew, M **type**); Canjob, March 27, 1904, *Goldman 791* (US).

27. Rhus Nelsonii Barkl., n. sp.[2] Pl. 22, fig. 1.

Large shrub; branches brown, at first densely ferruginous-pilose; leaves pinnately compound; leaflets 7–9, ovate or ovate-lanceolate, acute or acuminate at the apex, obtuse or subcordate at the base, subcoriaceous, margin obscurely subrevolute, entire, soft-pubescent but shining above, lighter and densely soft (ferruginous-)-pubescent below, glandularly pubescent on both surfaces, terminal leaflet 3–7 cm. long, 1.2–2.8 cm. broad, with petiolule 0.7–1 cm. long, lateral leaflets 2.5–5.5 cm. long, 1–2.5 cm. broad, with petiolules about 1.5 mm. long; inflorescences lateral, about 12 cm. long, about 8 cm. broad, bracts brown, ovate, pubescent, persistent; fruit pubescent with simple and glandular hairs.

From the specimens examined, this species seems to be quite distinct from *Rhus oaxacana.* However, their general aspects are similar, and when *R. Nelsonii* is better known it may prove to be a more pubescent phase of *R. oaxacana.* It is most easily distinguished from the latter by its soft-pubescent upper leaf-surface and its longer inflorescences. It is named for the collector of the type, E. W. Nelson.

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[1] **Rhus vestita** var. **Ghiesbreghtii** Barkley, n. var. Arbuscula; foliis imparipinnatis, foliolis magnis, pubescentia non circumscripta ad venas.—Collected at Teopisca, Chiapas, Mexico, coll. of 1864–1873, *Ghiesbreght 511* (M **type**).

[2] **Rhus Nelsonii** Barkley, n. sp. Arbuscula; foliis imparipinnatis, foliolis 7–9 ovato-lanceolatis circiter 5 cm. longis 2.5 cm. latis longo-acuminatis subcoriaceis supra molle-pubescentibus sed lucidis infra dilutioribus et densius molle-pubescentibus, rhachide non alato; floribus in spicis lateralibus compositis dispositis, spicis circiter 10 cm. longis, bracteis bracteolisque persistentibus.—Collected in foothills above Chilpancingo on Mani range, alt. 6000± ft., May 15, 1903, *Nelson 7047* (NY type).

Distribution: Guerrero (fig. 16).
MEXICO:
GUERRERO: foothills above Chilpancingo on Mani range, alt. about 6000 ft., May 15, 1903, *Nelson 7047* (US, NY **type**).

28. Rhus oaxacana Loesen., Bull. Herb. Boiss. II. **6**: 834. 1906.

Branches maroon-brown; leaflets 3–7, ovate-lanceolate, subacuminate, obtuse or subrotund and usually unequal at the base, subcoriaceous, subrevolute and entire-margined, pubescent above and beneath especially on the veins, somewhat glandularly pubescent and inconspicuously lustrous above, very dull yellowish-gray beneath, terminal leaflets 6–8 cm. long, 2–3 cm. broad, petiolules 0.6–1.8 cm. long, lateral leaflets 4–7 cm. long, 1–3 cm. broad, petiolules about 0.2 cm. long; rachis segments about 2 cm. long, stout; inflorescence terminal, 4.5 cm. long, 3.5 cm. broad, bracts lanceolate, 2.5 mm. long, 0.75 mm. broad, acutish, yellowish-green, pubescent on the outer surface with long, spreading hairs (about 0.7 mm. long), glabrous on the inner surface, persistent; sepals deltoid-lanceolate, about 2 mm. long, almost as broad, pubescent on the outer surface with long hairs, ciliate with simple hairs, colorless at margin and green near midrib; petals white in the dried state, rhombic-lanceolate, about 3 mm. long, 2.25 mm. broad, glabrous without, with scattered hairs on the inner surface, not ciliate; filaments shorter than the sepals; anthers oval, 1 mm. long and broad; fruit red, pubescent with simple and glandular hairs, about 8 mm. long and broad.

This is a seldom-collected species of Oaxaca, having ovate-lanceolate, strongly acuminate leaflets, comparatively short inflorescences, and the pubescence of the leaflets confined chiefly to the veins.

Distribution: Oaxaca (**fig. 16**).
MEXICO:
OAXACA: north end of valley of Oaxaca, alt. 6800-7800 ft., Oct. 3, 1894, *Nelson 1569* (NY, M photo.); canyon along wagon road, 6 miles above Dominguillo, alt.

4500–5500 ft., Oct. 30, 1894, *Nelson 1828* (NY); *Pringle 5655* (G); San Martin, Tlaxiaco, Dec. 5, 1895, *C. & E. Seler 1472* (G, NY, cotypes, M photo.).

29. **Rhus virens** Lindh. ex Gray, Bost. Jour. Nat. Hist. [Pl. Lindh. II] **6**: 159. 1850.

Rhus sempervirens Scheele, Linnaea **23**: 566. 1850.

Toxicodendron sempervirens Kuntze, Rev. Gen. Pl., pt. 1, pp. 153–154. 1891.

Schmaltzia virens Small, Fl. Southeast. U. S., pp. 729, 1334. 1903, and ed. 2. 1913.

Shrubs; branches brown, at first puberulent, later glabrate; leaves evergreen, compound; leaflets mostly 5–9, rhombic-ovate, rarely ovate or lanceolate-ovate, acutish, cuneate at the base, coriaceous, subrevolute and entire-margined, pubescent but shining and dark above, lighter, dull, sparsely soft-pilose, and with some glandular hairs beneath, terminal leaflets 2–4 cm. long, 1–1.75 cm. broad, long-petiolulate, lateral leaflets 1.25–4 cm. long, 1–2 cm. broad, short-petiolulate with petiolules about 2 mm. long; petioles about 1.5 cm. long, rachis segments about 1.25 cm. long, thin; inflorescence terminal, 4 cm. long, nearly as broad, bracts broadly ovate, 1.75 mm. long, nearly as broad, rounded-acutish at the apex, brownish, pilose on the outer surface, glabrous on the inner surface, ciliate with simple and glandular hairs, persistent; sepals subrotund, about 2 mm. long, about as broad, sparsely pilose on the outer surface, glabrous on the inner surface, ciliate with simple and glandular hairs; petals tan in the dried state, narrowly obovate-rotund, about 3 mm. long, 2 mm. broad, glabrous on the outer surface, pilose on the inner surface, not ciliate; filaments about as long as the sepals; anthers rectangular, 0.8 mm. long, about as broad; fruit 6 mm. long, 5 mm. broad, pubescent with simple and glandular hairs.

This is a widespread species of southwestern United States and northern Mexico. The leaflets of the Mexican specimens are more pubescent on the upper surface and tend to be somewhat larger. While *Rhus virens* Lindh. and *Rhus sempervirens* Scheele were published in the same year, it seems that the Lindheimer name appeared earlier in the year. This species, *Rhus Andrieuxii,* and *R. choriophylla* form a closely allied series, which, while very similar, are quite distinct.

Distribution: south-central Texas and southeastern New Mexico, south to Chihuahua and Nuevo Leon (fig. 16).

UNITED STATES:

Texas: expedition from western Texas to El Paso, New Mexico, May to Oct. 1849, *Wright 83* (Calif.); on dry hills near Bandera, Feb. 25, 1931, *von Schrenk* (M); Leon Springs, May 29, 1911, *Clemens* (M), *834* (RMt); Chisos Mts., June 19, 1931, *Mueller 8065* (M); Alpine, May 1925, *Studhalter 1041* (M); hills, New Braunfels, *Lindheimer (514),* 1846, *123, 348A,* Aug. and Sept. 1846, *348B,* and 1847 (M); Comanche Spring, New Braunfels, Nov. 1849, *Lindheimer 731* (F, M, Okla); Comal Co., Oct. 1850, *Lindheimer 729* (F, M, Okla), 1849–1851, *730* (F, M); Bears Mountain, Gillespie Co., *Jermy* (M); Cedar Mountain, *Jermy 122* (M); Limpia Canyon, 1889, *Nealley* (F); rocky banks, Limpia Canyon, 8 miles northwest of Ft. Davis, June 17, 1926, *Palmer 30997* (M); rocky bluffs and slopes, foothills of Davis Mts., Ft. Davis, Oct. 8, 1926, *Palmer 32109* (M); Boerne, May 22, 1916, *Palmer 9847* (M); Spanish Pass, Sept. 28, 1916, *Palmer 10847* (M); Chinati Mts., Aug. 1936, *Hinckley 821* (F); Presidio Co., *Reverchon 20* (M); rocky bluff near Twin Mts., 1882, *Reverchon 25,* May 20, 1903, *3812* (M); near Austin, May 13, 1872, *Hall 76* (F); Uvalde, Oct. 5–10, 1880, *Palmer 188 (14255)* (M); Comstock, March 20, 1911, *Blair 231* (M); stony hills near Devils River, Sept. 10, 1900, *Eggert* (M).

New Mexico: rocky slopes near the Carlsbad Caverns, Sept. 27, 1931, *Payson 54* (RMt).

MEXICO:

Chihuahua: Santa Eulalia Mts., Oct. 16, 1885, *Pringle 357* (F, G, Penn).

Coahuila: Muzquiz, July 7, 1936, *Marsh 367* (F); Sierra del Carmen, Aug. 21, 1936, *Marsh 566* (F); Mount Casacot, 21 miles southeast of Monclova, Feb.–Oct. 1880, *Palmer 189* (G, US); shrub-covered valley floor, Rancho Agua Dulce, Municipio de Muzquiz, July 1, 1936, *Wynd & Mueller 396* (M).

Nuevo Leon: Diente Canyon, mountains near Monterey, July 1933 (F); Sierra Madre above Monterey, alt. 3000 ft., Aug. 20, 1903, *Pringle 11397* (F, G).

30. Rhus choriophylla Woot. & Standl., Contr. U. S. Nat. Herb. **16**: 146. 1913.

Low shrub with few branches; branches maroon-brown, with a gray puberulence; leaflets 3–5, ovate, acute, obtuse to subcuneate at the base, coriaceous, subrevolute and entire-margined, pale green, rather dull above and below, terminal leaflet 2.5–5 cm. long, 1.5–2.5 cm. broad, long-petiolulate, lateral leaflets 2.5–5 cm. long, 1–2.25 cm. broad, with petiolules about 2 mm. long; inflorescence about 5 cm. long, about as broad, bracts ovate, acuminate, 3 mm. long, 1.75 mm. broad, acuminate (bracteoles 2 mm. long, 1.5 mm. broad, rounded at the apex), tan, densely pubescent on the outer surface, glabrous on the inner surface, ciliate with simple and glandular hairs, persistent; sepals deltoid, rounded at the apex, about 2 mm. long, 1.25 mm. broad, glabrous, ciliate with simple and glandular hairs; petals white in the dried state, rhombic-ovate, about 3 mm. long, half as broad, glabrous on the outer surface, slightly pilose at the base on the inner surface, not ciliate; filaments shorter than the sepals; anthers rectangular, 0.8 mm. long, about as broad; fruit 7 mm. long, 6 mm. broad, pubescent with simple and glandular hairs.

This species has its closest allies in *Rhus virens* and *R. Andrieuxii.* Compared with *Rhus virens* the leaflets are fewer, larger and glabrous, also the inflorescences are numerous and mostly lateral.

Distribution: southwestern New Mexico, adjacent Arizona and Sonora (fig. 16).

UNITED STATES:

NEW MEXICO: Organ Mts., Oct. 4, 1903, *Wooton* (RMt); Peña Blanca, Organ Mts., March 15, 1903, *Wooton* (M); Alamogordo, Sacramento Mts., alt. 4600 ft., April 12, 1902, *Rehn & Viereck* (RMt).

ARIZONA: Sorierta Valley, alt. 5700 ft., Aug. 1874, *Rothrock* (F); Bonita Canyon, Chiricahua Mts., alt. 6000 ft., Nov. 2, 1906, *Blumer* (ND), *1326* (F, M); rocky slopes, Mule Mts., Aug. 1911, *Goodding 968* (RMt); Bowie, Sept. 21, 1884, *Jones 4321* (F); Huachuca, March 23, 1894, *Toumey 16* (M); Santa Rita Mts., alt. 5500 ft., Sept. 26, 1880, *Engelmann* (M); above range reserve, Santa Rita Mts., Sept. 12–Oct. 18, 1903, *Griffiths 6060* (M); Santa Rita Mts., Sept. 9, 1884, *Pringle* (F), *15842* (M); Oracle, alt. 4600 ft., Aug. 28, 1903, *Jones* (M).

MEXICO:

SONORA: Fronteras, alt. 4550 ft., Sept. 22, 1890, *Hartman 31* (G).

31. **Rhus Andrieuxii** Engler in DC., Monogr. Phaner. **4**: 389. 1883.

Toxicodendron Andrieuxii Kuntze, Rev. Gen. Pl., pt. 1, p. 153. 1891.

Shrubs; branches brown, at first covered with a gray puberulence; leaflets 5–13, lanceolate-ovate, rhombic-oblanceolate-ovate or ovate, subacute to obtuse, unequally obtuse to cuneate at base, coriaceous, entire, not revolute-margined, more or less white corneous-margined, pubescent on the veins, otherwise glabrous above and beneath or somewhat glandularly pubescent beneath, shining and bluish-gray above, dull and yellowish beneath, nerves broad and veins remotely reticulate, terminal leaflets 2–3 cm. long, 0.7–1.5 cm. broad, with petiolules 2–9 mm. long, lateral leaflets 1.5–3 cm. long, 0.7–2 cm. broad, with petiolules about 1 mm. long; rachis segments 0.7–1.2 cm. long, petioles about 1.5 cm. long; inflorescences terminal, or terminal and lateral, compound spikes, bracts ovate-deltoid, blunt, 0.7 mm. long, about as broad, puberulent with simple glandular hairs on the outer surface, glabrous on the inner surface, ciliate with simple and glandular hairs; sepals deltoid-rotund, 1 mm. long, about as broad, glabrous, ciliate with simple and glandular hairs; petals in the dried state whitish, elliptic-ovate, 2 mm. long, 1.3 mm. broad, glabrous, not ciliate, filaments shorter than sepals; anthers rectangular, 0.8 mm. broad, about as long; fruit red, pubescent with simple and glandular hairs, 8 mm. long, about as broad.

This species of central Mexico has numerous small, ovate and acute leaflets, which are shining and rather grayish above. Its closest affinity apparently is with *Rhus virens*.

Distribution: Coahuila to Durango, south to Oaxaca (fig. 16).

MEXICO: 1833, *Andrieux 271* (F photo.); without definite locality, 1787–1804, *Sessé, Mociño, Castillo & Maldoñado 4942* (F).

COAHUILA: Saltillo, Sierra Madre, July 17–20, 1880, *Palmer 190* (F, G).

DURANGO: between Ramos and Inde, Aug. 11–14, 1898, *Nelson 4698* (NY).

HIDALGO: Zimapan, *Coulter 780* (F); rocky gulches, Ixmiquilpan, Sept. 1905, *Purpus 1289* (Calif, F, G, M, NY).

NUEVO LEON: Sierra Madre, near Monterey, Aug. 27, 1889, *Pringle 2677* (B).

OAXACA: from Fecomatlán to Pueblo Viejo, District of Nochixtlán, alt. 2500 m., June 21, 1907, *Carlos & Conzatti 1886* (F, US).

PUEBLA: El Riego, June 1905, *Purpus 1289A* (Calif, F, G, M, NY); July 1907, *Purpus 2730* (Calif); in the vicinity of San Luis Tultitlanapa, near Oaxaca, July 9, 1908, *Purpus 2730A* (Calif, F, G, M, NY, US), July 1908, *2730B* (Calif, F, G, M, US).

SAN LUIS POTOSI: Serrania de Santa Ana, Feb. 22, 1913, *Salazar* (US).

TAMAULIPAS: Cerro Parrena, Sierra San Carlos, July 13, 1930, *Bartlett 10308* (F); La Sardina, Sierra San Carlos, Aug. 14, 1930, *Bartlett 10953* (F); vicinity of Victoria, alt. about 320 m., Feb. 1–April 9, 1907, *Palmer 206* (Calif, F, G, NY); near Jaumave, *von Rozynski 244* (Calif), Dec. 5, 1931, *245* (F); near Victoria, 1931–1933, *von Rozynski 603* (F, M); near Nogales-Jaumave, March 1933, *von Rozynski 703* (F).

32. **Rhus Schiedeana** Schlecht., Linnaea **16**: 480. 1842; Engler in DC., Monogr. Phaner. **4**: 391. 1883, excl. specim. *Ghiesbreght 511* and *Parry & Palmer 125*.

Toxicodendron Schiedeanum Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891.

Shrub or small tree; branches brownish-gray, at first covered with a gray puberulence; leaflets mostly 9, elliptic-lanceolate, subacute, unequally rounded at the base, thin-coriaceous, subrevolute and entire-margined, glabrous except on the veins and for some glandular pubescence beneath, usually reddish and shining above, dull beneath, terminal leaflet 4–6 cm. long, 1.6–2.75 cm. broad, long-petiolulate, lateral leaflets 4–6.5 cm. long, 1.25–2.5 cm. broad, short-petiolulate; petioles about 2.5 cm. long, rachis segments about 2 cm. long, pubescent, wingless, stout; inflorescences terminal, or terminal and lateral, bracts deltoid-lanceolate, rounded-acutish, about 2 mm. long, almost as broad, brownish, densely pubescent on the outer surface with simple and glandular hairs, persistent; flowers numerous, white; sepals subrotund, about 2.4 mm. long, almost as broad, pubescent with simple and glandular hairs on the outer surface, glabrous on the inner surface, ciliate with simple and glandular hairs; petals white in the dried state, obovate-rotund, about 3.5 mm. long, 2 mm. broad, glabrous on both surfaces, not ciliate; filaments as long as the sepals; anthers oval, about 1 mm. long; fruit red, pubescent with glandular and simple hairs, 6 mm. long, 8 mm. broad; disk about 3 times as broad as the ovary, rather thick.

This species of southern Mexico and Guatemala has been confused frequently with several of the other members of this section.

Distribution: Vera Cruz and Chiapas, Mexico, to Guatemala (fig. 16).

MEXICO:

CHIAPAS: San Vicente, June 5, 1906, *Cook 76* (US); San Vicente, April 23, 1904, *Goldman 883* (US, M photo.); Juncana, April 27, 1904, *Goldman 894* (US); laguna, between Acala and San Cristobal, Feb. 24, 1931, *Souviron & Erlandson 61* (US).

VERA CRUZ: Palmar, Sept. 7, 1936, *MacDaniels 905* (F).

CENTRAL AMERICA:

GUATEMALA: ALTA VÉRAPAZ: Cobán, alt. 4300 ft., March 1887, *von Tuerckheim 1153* (US); BAJA VERAPAZ: Rosa, Sept. 1888, *von Tuerckheim 1432* (US); Berge bei Rosa, Oct. 1912, *von Tuerckheim 3913* (US).

33. **Rhus Tepetate** Standl. & Barkl., n. sp.[1] Pl. 22, fig. 2.

A shrub 2 m. high; branches brown, at first puberulent, dotted with prominent maroon-colored lenticels; leaflets 7–9, oblong, obtuse to subacute and submucronate at apex, subcuneate to subcordate at the base, subcoriaceous, distinctly subrevolute-margined, entire, obscurely and sparsely pubescent above and below with simple and glandular hairs, shining, green, and conspicuously whitened above at the veins, dull and paler below, terminal leaflet 3.5–6.5 cm. long, 2.5–4 cm. broad, lateral leaflets sessile, 2.5–4.5 cm. long, 1.5–3 cm. broad; petiole about 2 cm. long, stout; inflorescences lateral, 5.5 cm. long, 4 cm. broad, bracts brown, ovate-deltoid, 1.2 mm. long, about as broad, pointed, pubescent with simple and glandular hairs on the outer surface, glabrous on the inner surface, ciliate with simple and glandular hairs (bracteoles narrower, lighter-colored, and round at apex), persistent; sepals pallid, subrotund, about 1.4 mm. long, about as broad, glabrous on both sur-

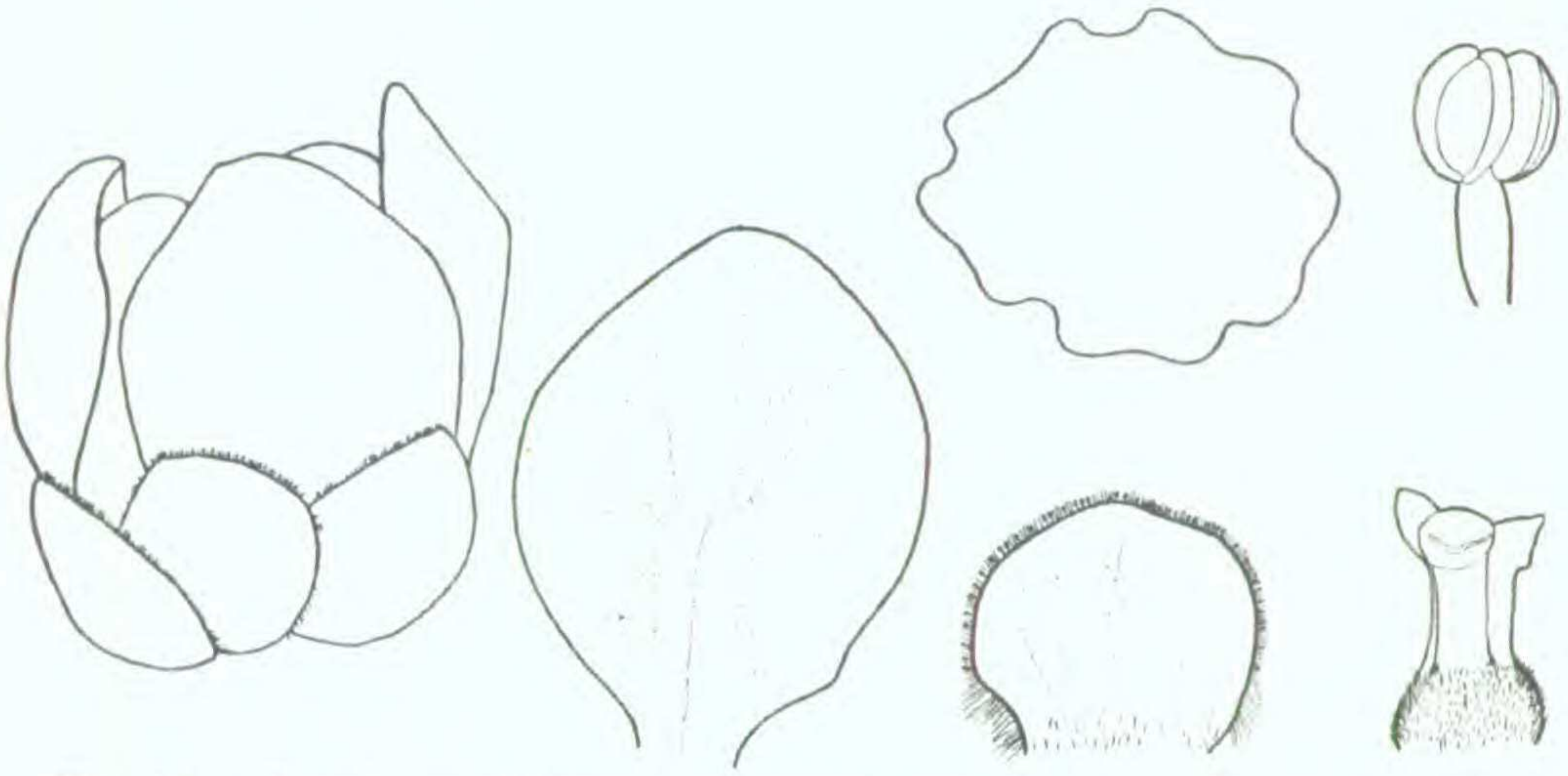

Fig. 18. Floral morphology of *Rhus Tepetate* Standl. & Barkl. × 10½.

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[1] **Rhus Tepetate** P. C. Standley & F. A. Barkley, n. sp. Arbuscula; foliis imparipinnatis, foliolis 7–9 oblongo-ovatis vel oblongo-obovatis 4 cm. longis 3 cm. latis supra obscure et rare pubescentibus sed lucidis, infra obscure pubescentibus glandulosisque subcoriaceis integris obtusis vel subacutis basi inaequalibus plus minusve subcordatis marginibus subrevolutis, rhachide non alata; floribus multis in spicis lateralibus compositis dispositis, bracteis persistentibus.—Collected in Sierra Charuco, Rio Mayo, Sonora, Mexico, September 10, 1935, *Howard Scott Gentry 1746* (F **type**).

faces, strongly ciliate with simple and glandular hairs; petals whitish in the dried state, broadly obovate-rotund, about 3.5 mm. long, 2.2 mm. broad, glabrous on the outer surface, sparsely pilose at base of the inner surface, not ciliate; filaments longer than the sepals; anthers oval, about 0.8 mm. long and broad; fruit not seen.

Morphologically this species is similar to *Rhus Schiedeana*, from which it may be distinguished by its broader and more oblong, more obtuse, subcordate leaflets as well as by its geographic range. Some of the specimens from Lower California have narrower and more obscurely oblong leaflets than the type. The specific name is the local vernacular of the shrub, of Nahuatl derivation.

Distribution: southern Sonora and southern Lower California (fig. 16).

MEXICO:

LOWER CALIFORNIA: Sierra de la Laguna, Jan. 23, 1890, *Brandegee* (Calif), *111* (PA); Sierra de San Francisco, Oct. 18, 1890, *Brandegee 111* (Calif); Sierra de la Laguna, Oct. 2, 1899, *Brandegee* (Calif, NY); from San Bernardo to El Sanz, Sierra de la Laguna, alt. 4500 ft., Jan. 21, 1906, *Nelson 7442* (US).

SONORA: canyon, Rio Mayo, Sierra Charuco, Sept. 10, 1935, *Gentry 1746* (Cath, M, F **type**).

34. Rhus macropoda Barkl., n. sp.[1] Pl. 23, fig. 1.

Shrub or small tree; branches maroon-brown; leaflets 3–9, usually 5, ovate, acuminate, subcuneate and usually unequal at the base, subcoriaceous, entire-margined, not revolute, mostly glabrous above and beneath but with some glandular hairs, obscurely pubescent on the veins, green above, veins and margins prominently pallid, dull and lighter green below, long-petiolulate, terminal leaflet 5–9 cm. long, 3–4 cm. broad, petiolules 1.5–2.5 cm. long, lateral leaflets 4–9 cm. long, 2.5–4 cm. broad, petiolules 0.5–1 cm. long, rachis segments about 4 cm. long, slender;

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[1] **Rhus macropoda** Barkley, n. sp. Arbuscula; foliis imparipinnatis, foliolis 3–9 plerumque 5 ovatis circiter 8 cm. longis 4 cm. latis subacuminatis subcoriaceis utrinque fere glabris vel plus minusve pubescentibus glandulosisque basi subcuneatis et plerumque inaequalibus in nerviis obscure pubescentibus, veniis pallidis minute et obscure reticulatis puberulentis, petiolulis ca. 1 cm. longis; floribus multis in spicis lateralibus compositis dispositis, bracteis persistentibus.—Collected at San Miguel Alborrados, Oaxaca, Mexico, alt. 6500 ft., July 2, 1894, *E. W. Nelson 539*, (US **type**).

inflorescences lateral, axillary, compound spikes 7 cm. long, 6 cm. broad, bracts ovate, acute, 1 mm. long, 1 mm. broad, yellowish-green, pubescent on the outer surface with both glandular and spreading non-glandular hairs, glabrous on the inner surface, persistent; sepals deltoid-lanceolate, about 2 mm. long, 1.5 mm. broad, ciliate with simple and glandular hairs, yellowish-green; petals white in the dried state, narrowly obovate-rotund, about 3 mm. long, 2 mm. broad, glabrous on the outer surface, with scattered hairs at the base on the inner surface, not ciliate.

The conspicuously whitened veins and very long petiolules of the leaves of this species give it a superficial resemblance to *Metopium* and make it one of the most easily recognizable species of this section.

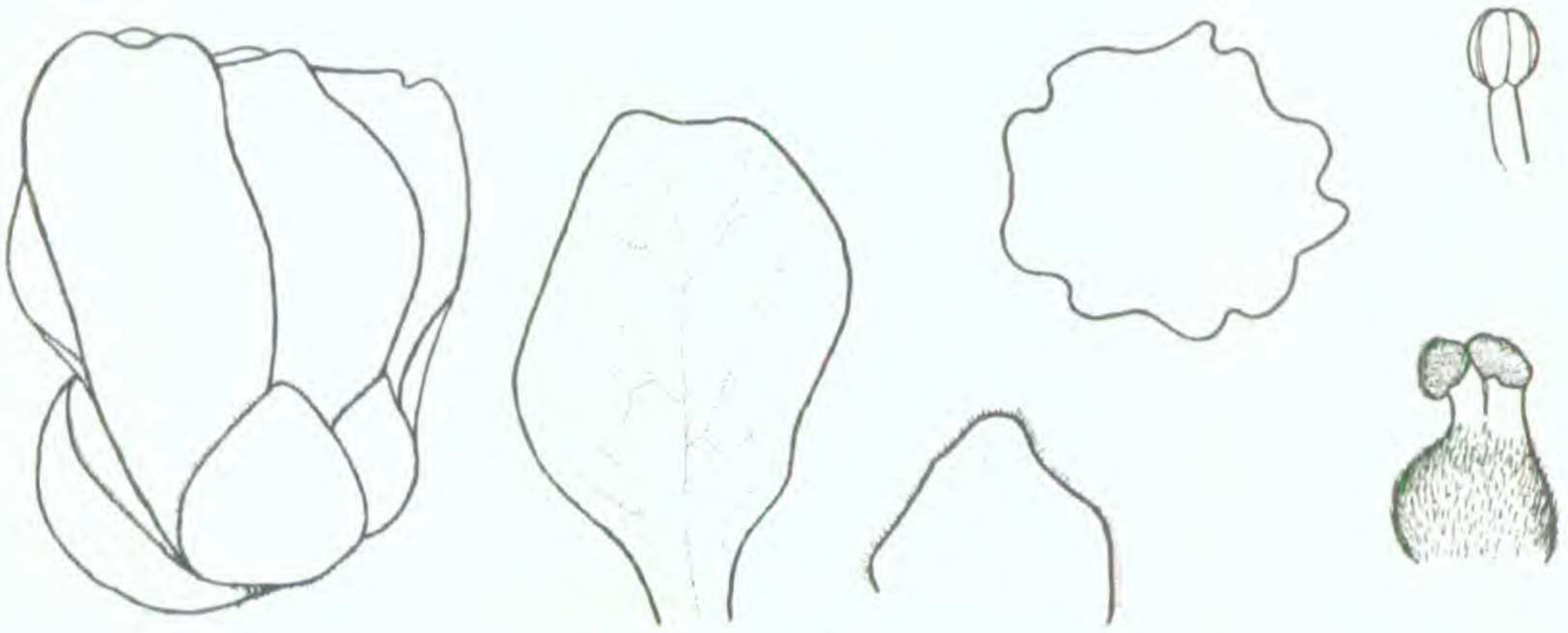

Fig. 19. Floral morphology of *Rhus macropoda* Barkl. × 10½.

Distribution: Vera Cruz and Oaxaca (fig. 16).

MEXICO:

OAXACA: San Miguel Alborrados, alt. 6500 ft., July 2, 1894, *Nelson 539* (US **type**, M photo.); west slope of Mount Zempoaltepec, alt. 7700–8000 ft., July 5–13, 1894, *Nelson 541* (US).

VERA CRUZ: Palmar, Sept. 7, 1936, *MacDaniels 882* (F).

35. **Rhus ciliolata** Turcz., Bull. Soc. Nat. Moscou **31**^{1}: 470. 1858.

Shrubs; branches dark brown with an obscure gray puberulence; leaves trifoliolate, petiole about 3 cm. long, stout; leaflets deltoid-ovate, acuminate at apex, obtuse to subcordate and unequal at base, petiolulate, coriaceous, obscurely subrevolute and entire-margined, shining on both surfaces, glabrous except on veins above and for some glandular hairs below, a fine reticulum of small veins very prominent, especially in the older leaves, terminal leaflet 5–8 cm. long, 1.7–3.2 cm. broad, petiolules about 1 cm. long, lateral leaflets 3.5–4.5 cm. long, 2–2.5 cm. broad, petiolules 2–4 mm. long; inflorescence terminal, about 3 cm. long, 2 cm. broad, bracts deltoid, pilose on the outer surface, persistent; fruit pubescent with simple and glandular hairs, about 8 mm. long and broad.

The trifoliolate leaves, the ovate, long-acuminate leaflets, and the conspicuous reticulum of small veins characterize this little-known species. The affinity of this species is probably with *Rhus oaxacana.*

Distribution: Puebla (fig. 16).

MEXICO:

PUEBLA: in the vicinity of San Luis Tultitlanapa, near Oaxaca, July 1908, *Purpus 3166* (Calif, G, M photo., NY, US).

36. Rhus profusa Barkl., n. sp.[1] Pl. 23, fig. 2.

Shrub or small tree; branches brown, furrowed, at first puberulent; leaflets 9–13, broadly lanceolate, subcuneate and unequal at the base, long-acuminate, acute at the apex, coriaceous, entire and frequently revolute-margined, glabrous and shining above, glabrous except on the midvein and for glandular hairs below, with a reticulum of fine veins prominently pallid below, terminal leaflet about 6 cm. long, 2–2.5 cm. broad, petiolule 0.3–1.3 cm. long, lateral leaflets 4.5–6 cm. long, 2–3 cm. broad, subsessile with petiolules 0–3 mm. long; petiole about 2.5 cm. long, stout; inflorescences lateral and terminal, 8–18 cm. long, 7–10 cm. broad, bracts brown, pubescent on the outer surface, ciliate with simple hairs, persistent; sepals deltoid, blunt, about 1.2 mm. long, 1.2 mm. broad, glabrate, ciliate with simple hairs, persistent; petals narrowly obovate, slightly pubescent on inner surface, 2 mm. long, 1 mm. broad; anthers oval, about 0.8

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[1] **Rhus profusa** Barkley, n. sp. Arbuscula; foliis imparipinnatis, foliolis 9–13 circiter 5 cm. longis 2.5 cm. latis late lanceolatis acuminatis coriaceis supra glabris et lucidis infra cum reticulo venularum pallidarum, foliolis lateralibus subsessilibus, foliolo terminale petiolulato foliolas laterales subaequanto, rhachide non alato; floribus multis in spicis lateralibus terminalibusque compositis dispositis, bracteis bracteolisque persistentibus.—Collected near Las Caños, San Luis Potosi, Mexico, Oct. 15–21, 1902, *Edw. Palmer 214* (US **type**).

mm. in diameter; filaments thick, about as long as the sepals; fruit 7 mm. long, 7 mm. broad, pubescent with simple and glandular hairs.

The erect, spreading inflorescence of this species is its most outstanding character. However, its long-acuminate, lanceolate, and shining leaflets make it a very distinctive species. The specimen from Guerrero is somewhat atypical.

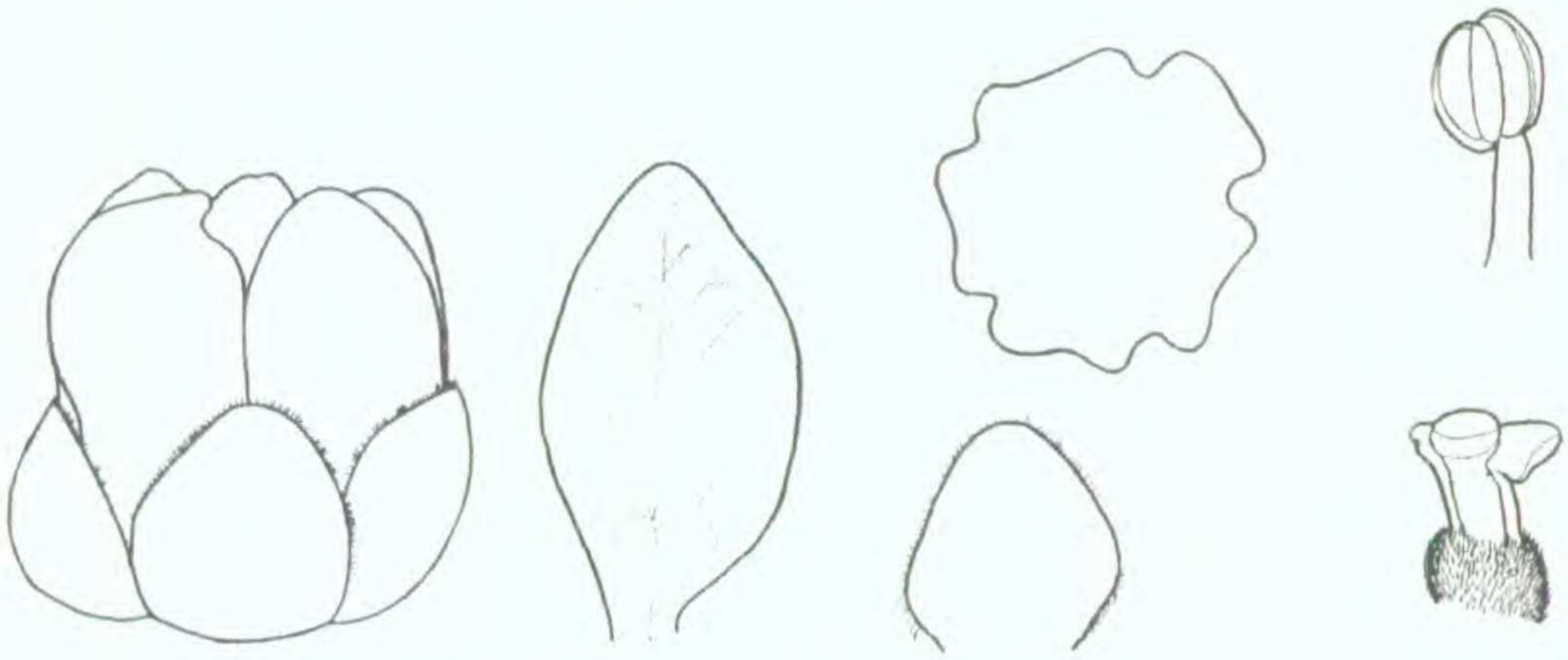

Fig. 20. Floral morphology of *Rhus profusa* Barkl. × 10½.

Distribution: San Luis Potosi and Guerrero (fig. 16).
MEXICO:

Guerrero: between Chilapa and Tixtla, alt. 5200–7000 ft., Dec. 17, 1894, *Nelson 2167* (US).

San Luis Potosi: near Las Caños, Oct. 15–21, 1902, *Palmer 214* (F, M photo., US **type**).

Section Rhoeidium (Greene) Barkley, n. sect.

Rhoeidium Greene, Leafl. Bot. Obs. & Crit. **1**: 143. 1905.

Large, deciduous, spinose shrubs. Flowers cream-colored, polygamo-dioecious, in solitary or small clustered spikes formed in the summer and autumn, expanding in the spring before the leaves, sessile or nearly so and subtended by coriaceous, concave and persistent bracts, each enclosing a pair of smaller bractlets. Drupe orange-red, almost symmetrical; seed bony, rough, somewhat flattened. Leaves 3–9-foliolate, thin, more or less pubescent.

Texas to Arizona, south to central Mexico (fig. 21).

Type species: **Rhus microphylla** Engelm. ex A. Gray in Smiths. Contr. [Pl. Wright. I] **3**^{5}: 31. 1852.

This section contains a single, somewhat variable species widespread in the arid regions of temperate North America. While standing quite distinct, its nearest affinities seem to be with section LOBADIUM.

37. **Rhus microphylla** Engelm. ex A. Gray in Smiths. Contr. [Pl. Wright. I] **3**^{5}: 31. 1852. Pl. 24, fig. 1.

Rhus microphylla var. *vestita* Engler in DC., Monogr. Phaner. **4**: 387. 1883.
Rhoeidium cinereum Greene, Leafl. Bot. Obs. & Crit. **1**: 144. 1905.
R. glabellum Greene, *ibid.* 143.
R. microphyllum Greene, *ibid.* 143.
R. Potosinum Greene, *ibid.* 144.
R. retusum Greene, *ibid.* 144.
R. rugulosum Greene, *ibid.* 144.
R. vestitum Greene, *ibid.* 144.
Schmaltzia microphylla Small, Fl. Southeast. U. S., pp. 728, 1334. 1903.
Toxicodendron microphyllum Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891.

Shrub or small tree, 1–5 m. high; branches tending to be spinescent, brown, at first puberulent, lenticels prominent; leaves pinnately compound, petiole about 3 mm. long; leaflets 5–9, oval to lanceolate-ovate, obtuse and mucronate to subacute, base cuneate and more or less unequal, sessile, thin, subrevolute and entire-margined, appressed-pilose and dull on both surfaces, slightly darker above, terminal leaflet 0.4–1.2 cm. long, 3–4 mm. broad, lateral leaflets 0.4–1 cm. long, 1.5–4 mm. broad; rachis segments 2–6 mm. long, winged; inflorescence a rigid, once-branched compound spike borne at the upper nodes, about 5 cm. long, nearly as broad, bracts broadly ovate, 1 mm. long, 1.75 mm. broad, brownish, densely pilose on the outer surface and with a few scattered glandular hairs, glabrous on the inner surface, ciliate with simple hairs, persistent; flowers numerous, each one subtended by a bract and two narrower bracteoles, pedicels 0.5 mm. long; sepals deltoid-rotund, about 1 mm. long, 0.8 mm. broad, acute, glabrous on both surfaces, ciliate with simple hairs; petals whitish in the dried state, rhombic-ovate to ovate, about 2.3 mm. long, 1.2 mm. broad, glabrous without, pilose on the inner surface, ciliate; filaments longer than the sepals; anthers oval, 0.6 mm. broad, 0.8 mm. long; disk 1.7 mm. broad, yellow, lobed; style more or less united; fruit 5 mm. long, 5 mm. broad, orange-red, pubescent with simple and glandular hairs.

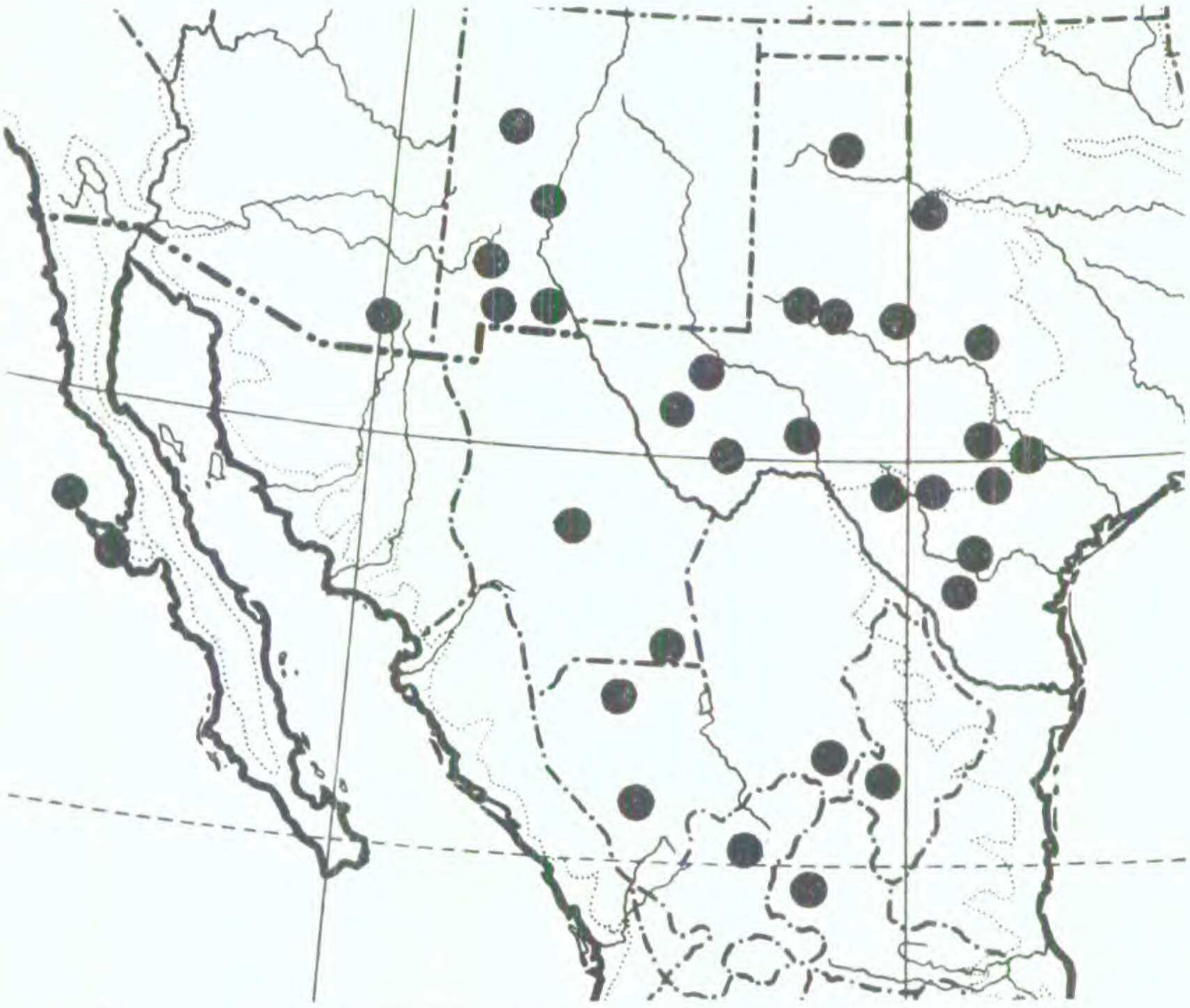

Fig. 21. The geographic distribution of *Rhus microphylla* Engelm.

While this species shows some variations, they are so minute as to make the species appear remarkably uniform over its range. It is a shrub which resembles its competitors in the desert-plains scrub, but which is strikingly unlike the other members of the complex in general aspect.

Distribution: western Texas to southeastern Arizona, south to Durango, Nuevo Leon, and Zacatecas (fig. 21).

UNITED STATES:

Texas: 1880, *Palmer* (US type of *R. rugulosum);* Gamble's Ranch, June 6, 1918, *Palmer 13972* (M); San Antonio, June 12, 1911, *Clemens 835* (M); Bexar Co., 1903, *Jermy* (M); dry upland thickets, San Antonio, March 16, 1916, *Palmer 9182* (M); mesa north of the Chisos Mts., June 27, 1931, *Moore & Steyermark 3290* (M); Chisos Mts., June 30, 1931, *Mueller 8064* (M); Marathon, Aug. 13, 1936, *von Schrenk 54* (M); Brownwood, Sept. 1880, *Reverchon* (F); 20 miles west of New Braunfels, Oct. 1846, *Lindheimer 249,* 15 miles west of New Braunfels, Nov. 1849, *200* (M), Comanche Spring, New Braunfels, March 1850, *734*[1] (M, US), May 1850, *735* (M, Okla, US); flats near Van Horn, July 11, 1900, *Eggert* (M); frequent at base of mountain, El Paso, April 3, 1919, *Hanson* (M); El Paso, April 1881, *Vasey* (M); Cherryspring, *(Jermy) 564,* and Threadgile Valley, Gillespie Co., *774* (M); Medicine Mound, Oct. 28, 1916, *Palmer 11175* (M); near Big Spring, June 11, 1900, *Eggert,* and May 9, 1901 (M); mesa west of Mt. Livermore, Jeff Davis Co., alt. 1800 m., June 14, 1931, *Moore & Steyermark 3085* (M); Limpia Canyon, 10 miles northwest of Fort Davis, June 17, 1926, *Palmer 30996,* and May 12, 1914, *Young* (M); Bracketville, March 22, 1900, *Trelease 42* (M); Cotulla, March 17, 1917, *Palmer 11308* (M); near Stanton, June 13, 1900, *Eggert* (M); desert plains, Aug. 3, 1934, *Barkley 1074* (M); west of Pecos, April 20, 1902, *Tracy & Earle 112* (M); near Feodora, May 26, 1928, *Palmer 33552* (M); Fort Concho, March–April 1882, *Reverchon (Curtiss' 449)* (ND type of *R. glabellum,* M, US), Aug. 11, 1875, *(156) 693* (M); dry rocky ground, Sabinal, June 8, 1916, *Palmer 10122* (M); Comstock, March 21, 1911, *Blair 217* (M); Laredo, March 21, 1903, *Reverchon* (M).

New Mexico: Goldsburg, April 5, 1934, *Allen* (M); east of Agricultural College, May 3, 1906, *Standley 39* (M); 1852, *Wright 1341* (US type, M photo.); near Las Cruces, 9100 ft., July 1, 1897, *Wooton 68* (M, ND); Peloncillo Mts., 20 miles northeast of Rodeo, alt. 4000 ft., June 16, 1930, *Goodman & Hitchcock 1146* (M); Berendo Creek, May 23, 1904, *Metcalfe 924* (M); Florida Mts., Aug. 27, 1895, *Mulford 1045* (M); between San Marcial and Nogal Canyon, June 23, 1921, *Ferris & Duncan 2343* (M); dry hills near Los Lunas, Aug. 1880, *Rusby 70* (M).

Arizona: Oct. 16, 1904, *Thornber 544* (M); Paradise, Chiricahua Mts., alt. 5300 ft., Aug. 21, 1906, *Blumer 94* (ND), *1322* (M); Douglas, May 1907, *Goodding 2236* (M); Douglas, April 8, 1930, *Jones 25655* (M, ND).

MEXICO:

Chihuahua: San Bernardino Springs between Mapini, Durango, and Guajuquilla, April 18, 1847, *Gregg 482* (M); mountains northwest of Chihuahua, June 18, 1936, *LeSueur 770* (F); near Lake Santa Maria, Sept. 7, 1899, *Nelson 6422* (US type of *R. retusum);* vicinity of Chihuahua, alt. 1300 m., April 8–27, 1908, *Palmer 19* and *54* (F); near Chihuahua, March 20 and May 25, 1885, *Pringle 171* (F), and April 2 and Oct. 18, 1886, *894* (M, US); Aug. 1852, *Thurber (Mex. Bound. Surv.)* (F).

Coahuila: pueblo near Saltillo, March 30, 1847, *Gregg 378* (M); del Carmen Mts., Sept. 12, 1936, *Marsh 839* (F); Saltillo, April 16, 1902, *Nelson 6113* (M);

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[1] There was some question as to what was intended as the type of this species; while this was distributed as the type collection, *Wright's 1341* was mentioned in the original description and has later been shown to be the type.

6 miles east of Saltillo, April 15–20, 1880, *Palmer 193* (F), Saltillo, 1898, *31*, and *141* (F, M, US); "Sierra de Barbacon," July 1910, *Purpus 4500* (F, M); east of Hacienda La Rosa, Municipia de Ramos Ariape, June 14, 1936, *Wynd & Mueller 48* (M).

DURANGO: Durango, April–Nov. 1896, *Palmer 91* (F, M, US, **cotypes** of *R. cinereum)*, and *92* (F, M, US); Sierra de Barbecoa, July 1910, *Purpus 4500* (US); Indé, alt. 2000 m., June 1927, *Reko 5157* (F).

LOWER CALIFORNIA: Cedros Island, Dec. 8, 1888, *Pond*, and Port San Bartolomé, Nov. 27, 1889 (ND).

NUEVO LEON: Hacienda Pablillo, Galeana, Aug. 14, 1936, *Taylor 165* (F); Cerralvo, below Monterey and Malamora, May 29, 1847, *Wislizenus 359* (M).

SAN LUIS POTOSI: Charcas, July–Aug. 1934, *Lundell 5197*, and *5309* (F); coll. of 1878, *Parry & Palmer 126* (F, M, **cotypes** of *R. Potosinum)*.

ZACATECAS: near Cedro, June 1908, *Kirkwood 201* (F).

Section LOBADIUM (Raf.) DC., Prodr. **2**: 72. 1825.

Lobadium Raf., Am. Month. Mag., p. 357. 1819; Koehne, Deutsche Dendrol., p. 360. 1893, as subsection.

Rhus Ait., Hort. Kew. **1**: 365. 1789, in part.

Schmaltzia Desv., Journ. de Bot. Appl. **1**: 229. 1813; Small, Fl. Southeast. U. S., p. 728. 1903, in part; Greene, Leafl. Bot. Obs. & Crit. **1**: 128. 1905; Schneid., Illustr. Handb. Laubholzk. **2**: 148. 1907, as subgenus.

Toxicodendron Miller, Gard. Dict., ed. 8. 1768, as to *T. Crenatum* Kuntze, Rev. Gen. Pl., pt. 1, p. 153. 1891, in part.

Trichocarpae Engler, Bot. Jahrb. **1**: 379. 1881, as section, in part.

Turpinia Raf., Med. Repos. N. Y. **5**: 352. 1808, non Vent., Choix d. Pl., p. 31. 1803.

Gracefully diffuse shrubs with slender, spreading branches. Flowers numerous, yellow or white, polygamo-dioecious, in solitary or small apically clustered spikes formed in the summer and autumn, expanding in the spring before or with the leaves, sessile or pedicellate, and subtended by coriaceous, concave and persistent bracts, each enclosing a pair of much smaller bractlets. Drupe orange-red, almost symmetrical; seed bony, smooth, somewhat flattened. Leaves 1–5-foliolate, but mostly 3-foliolate, thin, more or less pubescent.

North America, from Canada to southern Mexico.

Type species: **Rhus aromatica** Ait., Hort. Kew. **1**: 367. 1789 *(Toxicodendron Crenatum* Miller, Gard. Dict., ed. 8. 1768).

This section is probably related to PSEUDOSCHMALTZIA through such species as *Rhus allophylloides* and *R. Duckeri.* The Mexican species are rather well defined. In the area of overlap in the United States, the species are separable with difficulty.

KEY TO THE SPECIES AND VARIETIES

Scandent shrubs, about 3 meters in length; bracteoles over half as large as the bracts...*38. R. allophylloides*
Erect shrubs, rarely much exceeding 1 meter in height; bracteoles less than half as long as the bracts.
Basal leaflets mostly ovate-lanceolate; flowers subsessile, usually flowering before the appearance of the leaves; terminal leaflets mostly over 4 cm. long; eastern and central North America and Mexico.
Leaflets and branches at first densely ferruginous-pilose; central Mexico.
Leaflets densely pilose at maturity..................*39. R. schmidelioides*
Leaflets not pilose at maturity......*39a. R. schmidelioides* var. *potosinensis*
Leaflets and branches at first glabrous or puberulent, never densely ferruginous-pilose; eastern North America................*40. R. aromatica*
Basal leaflets mostly obovate; flowers long-pedicellate, usually flowering at the time of the appearance of the leaves; terminal leaflets mostly under 4 cm. long (except in *41a);* western and central North America.
Terminal leaflets usually over 4 cm. long; central North America...... ....*41a. R. trilobata* var. *serotina*
Terminal leaflets usually under 4 cm. long (except in *41g);* western North America (except *41b).*
Terminal leaflets much longer than broad; fruit small (about 6 mm. diam.); central North America and the Rocky Mountains.
Leaflets at maturity usually glabrate; fruit mostly sparsely pubescent; Great Plains and the Rocky Mountains........*41. R. trilobata*
Leaflets at maturity densely puberulent; fruit densely pilose; Great Lakes region.......................*41b. R. trilobata* var. *arenaria*
Terminal leaflets nearly as broad as long; fruit mostly large (over 7 mm. diam.); southwestern North America and along the Pacific Coast.
Flowering in July and August; pedicels usually exceeding 5 mm. in length..........................*41c. R. trilobata* var. *racemulosa*
Flowering before July; pedicels usually less than 4 mm. in length.
New branches densely pubescent, leaves tomentose, at least below ....*41d. R. trilobata* var. *pilosissima*
New branches and leaves mostly glabrate, at least not densely pubescent.
Mostly unifoliolate..............*41e. R. trilobata* var. *simplicifolia*
Mostly trifoliolate.
Terminal leaflet not deeply lobed; leaflets more or less glabrate ....*41f. R. trilobata* var. *anisophylla*
Terminal leaflet deeply lobed; leaflets mostly somewhat pubescent......................*41g. R. trilobata* var. *quinata*

38. Rhus allophylloides Standl., Field Mus. Bot. Ser. **4**: 220. 1929. Pl. 24, fig. 2.

A semiscandent shrub about 3 m. long; leaflets 3, rhombic-ovate, acute, cuneate at the base, subcoriaceous, revolute-margined, serrate-dentate near the apex, entire towards the base, soft-pubescent above, densely soft-pubescent beneath, terminal leaflets 7–10 cm. long, 3.5–5.5 cm. broad, with petiolules about 1 cm. long, lateral leaflets 4.5–7 cm. long, 2–3.5 cm. broad, sessile; inflorescence terminal, 5 cm. long, 3.5 cm. broad, bracts deltoid, about 2 mm. long and broad, acutish, pubescent on both surfaces and ciliate with simple hairs, persistent; sepals deltoid-ovate, 1.5 mm. long, width slightly narrower, glabrous, ciliate with simple hairs; petals white in the dried state, elliptical, about 3 mm. long, 2 mm. broad, ciliate with simple hairs; filaments about as long as the sepals; anthers oval, 1 mm. long and broad; fruit red, pubescent with simple and glandular hairs.

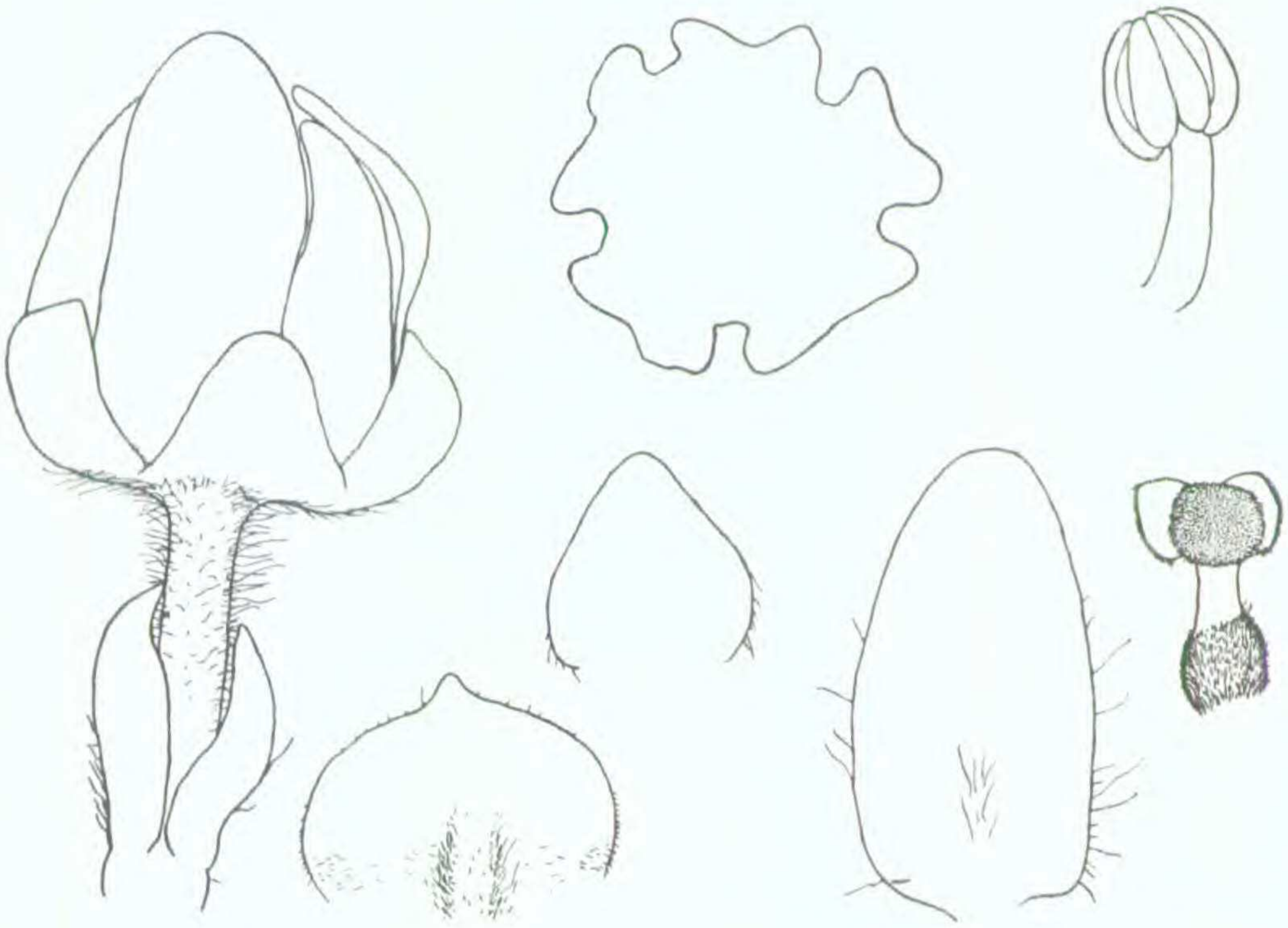

Fig. 22. Floral morphology of *Rhus allophylloides* Standl. × 10½.

Distribution: Jalisco to Michoacan (fig. 23).

MEXICO:

JALISCO: near stream in thicket on steep hillside, trail from San Sebastian to Real Alto, Sierra Madre Occidental, alt. 2000 m., Feb. 4, 1927, *Mexia 1640* (F, US **type,** M photo.); Real Alto, trail to Arroyo las Canelillas, Sierra Madre Occidental, Feb. 22, 1927, *Mexia 1729* (US).

MICHOACAN: Uruapan, 1925–1926, *Woronow 2919* (F).

39. Rhus schmidelioides Schlecht., Linnaea **16**: 482. 1842.

Rhus aromatica var. *schmiedelioides* Engler in DC., Monogr. Phaner. **4**: 386. 1883.

Shrub; branches dark brown, densely ferruginous-pilose; leaflets 3, subcoriaceous, rhombic-ovate, acute at the apex, cuneate at the base, dentate-serrate-margined, ferruginous pubescent above and beneath, lighter below; leaflets sessile, terminal about 3.5 cm. long, 2.2 cm. broad, lateral leaflets about 1.7 cm. long, 1 cm. broad; petiole about 1.5 cm. long; inflorescence a terminal, small, compound spike about 3 cm. long, 2 cm. broad, bracts deltoid, 1 mm. long, 0.7 mm. broad, glabrous, sparsely ciliate; sepals ovate, 1 mm. long, 0.7 mm. broad, apex obtuse, sparsely pilose on the inner surface, glabrous on the outer surface, scarcely ciliate; petals ovate, 1.5 mm. long, 1 mm. broad, glabrous on the outer surface, sparsely pilose on the inner surface, not ciliate; fruit red, 6 mm. long, 6 mm. broad, pubescent with simple and glandular hairs.

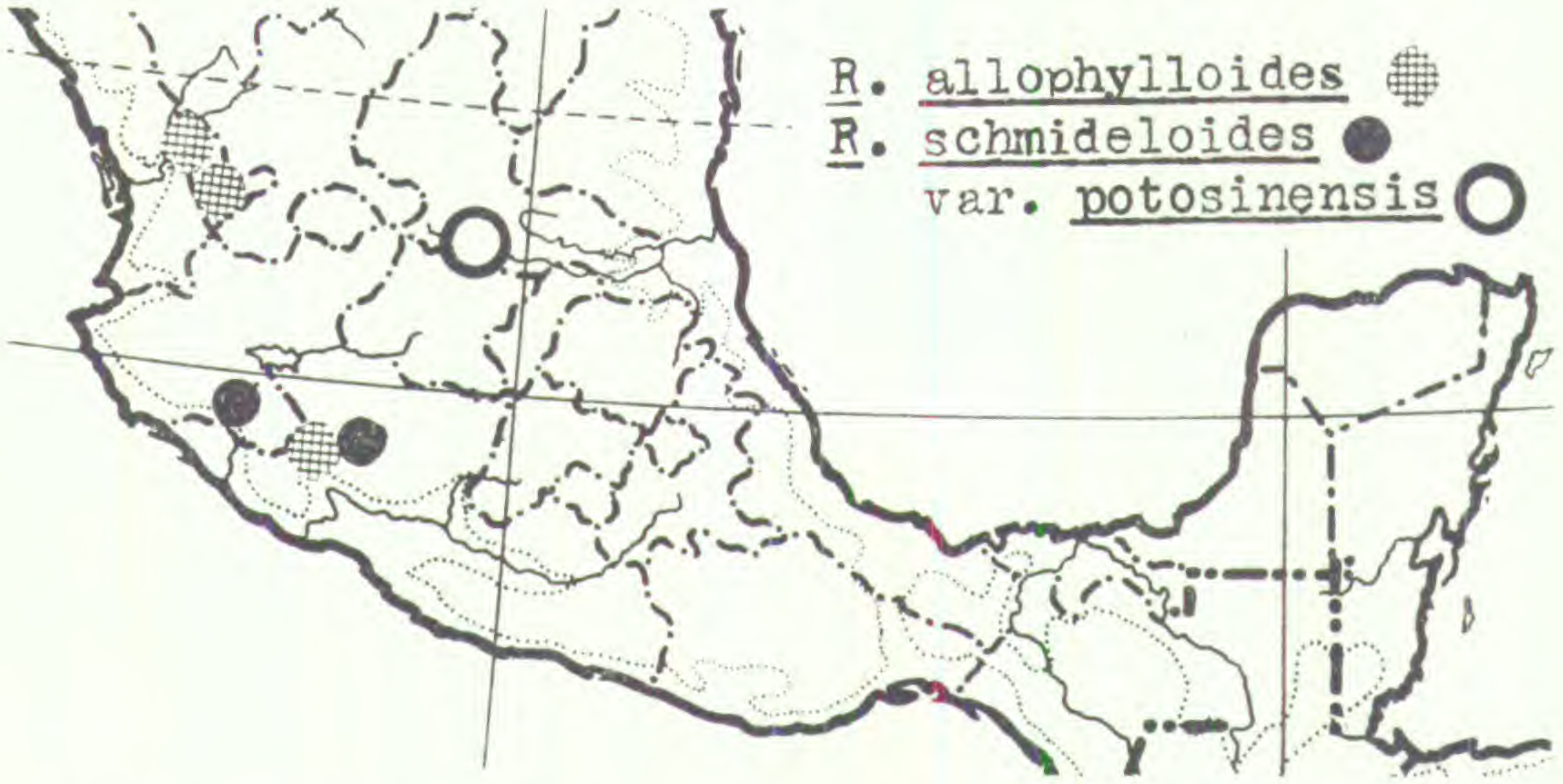

Fig. 23. The geographic distribution of *Rhus allophylloides* Standl., *R. schmidelioides* Schlecht., and *R. schmidelioides* var. *potosinensis* Barkl.

This species closely resembles *R. aromatica* Ait. of eastern United States. Like that species, the amount of pubescence varies considerably. The diseased specimen from Michoacan is atypical.

Distribution: Jalisco to Michoacan (fig. 23).
MEXICO: coll. of 1891–1892, *Palmer* (US, M photo.).
JALISCO: Colima Volcano, July 13, 1892, *Jones 122* (M, US).
MICHOACAN: Santa Catarina, near Uruapan, Jan. 21, 1926, *Woronow* (F).

39a. Rhus schmidelioides var. **potosinensis** Barkl., n. var.[1]
Shrub; leaves trifoliolate, long-petiolate; leaflets dentate-crenate, not pilose at maturity.

The variety tends to have longer petioles, and the leaflets tend to be much less pubescent when mature than in the species.

MEXICO:
SAN LUIS POTOSI: Alvarez, May 19–22, 1905, *Palmer 586* (Calif, M **type**, US, M photo.).

40. Rhus aromatica Ait., Hort. Kew. **1**: 367. 1789.
Rhus aromatica var. *glabra* Engler in DC., Monogr. Phaner. **4**: 385. 1883.
R. canadense Marsh., Arbust. Am., p. 129. 1785, non Mill., Gard. Dict., ed. 8. 1768.
R. canadensis var. *illinoensis* Fernald, Rhodora **10**: 52. 1908.
R. suaveolens Ait., Hort. Kew. **1**: 368. 1789.
R. illinoensis Ashe, Bull. Torr. Bot. Club **55**: 465. 1928.
R. illinoensis var. *formosa* Ashe, *ibid.* 466.
R. Nortonii Rydb., Brittonia **1**: 93. 1931.
R. crenata Rydb., Fl. Prair. & Plains, p. 526. 1932, non Thunb., ex Hoffm., Phytogr. Blaetter **1**: 28. 1803.
Betula triphylla Fant in Thunberg, Diss. Bot. Desc., p. 12, *pl. 1, fig. 2.* 1807.
Lobadium amentaceum Raf., Am. Month. Mag., p. 358. 1819.
L. suaveolens Raf., Jour. Phys. **89**: 98. 1819.

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[1] **Rhus schmidelioides** var. **potosinensis** Barkley, n. var. Arbuscula; foliis ternatis, foliolis dentato-crenatis maturitate non pilosis.—Collected at Alvarez, San Luis Potosi, Mexico, May 19–22, 1905, *Edw. Palmer 586* (M **type**).

L. trifoliatum Raf., Cat. Bot. Gard. Trans. Univ., p. 14. 1824.

L. aromaticum Raf. ex Steud., Nom. Bot., ed. 2, p. 451. 1841.

Myrica trifoliata Printz, Pl. Afr. Rar. [In L., Amoen. Acad. 5: CVI. p. 77. 1764], p. 28. 1760; Hort. ex Steud., Nom. Bot., ed. 2, p. 451. 1841.

Schmaltzia aromatica Desv., Jour. de Bot. Appl. **1**: 229. 1813; Steud., Nom. Bot., ed. 2. **2**: 531. 1841.

S. suaveolens Desv., *ibid.*

S. crataegifolia Greene, Leafl. Bot. Obs. & Crit. **1**: 130. 1905.

S. crenata Greene, *ibid.* 128.

S. formosa Greene, *ibid.* 131.

S. illinoensis Greene, *ibid.* 131.

S. Nortonii Greene, *ibid.* 132.

S. serrata Greene, *ibid.* 129.

Toxicodendron Crenatum Mill., Gard. Dict., ed. 8. 1768.

T. cuneatum Mill., ex Koch, Dendrol. **1**: 579. 1869.

Turpinia glabra Raf., Med. Repos. N. Y. **5**: 352. 1808.

T. aromatica Raf., *ibid.*

T. pubescens Raf., *ibid.*

T. suaveolens Raf., *ibid.*

Shrub 0.5–1.5 m. high; branches light brown at first, usually slender, puberulent or sometimes glabrate; leaves deciduous, petiole about 2.5 cm. long; leaflets 3, thin, sessile or subsessile, at first puberulent, later glabrate, terminal leaflet broadly ovate to rhombic-ovate, 4–8 cm. long, 2.2–6 cm. broad, crenate-dentate to serrate near apex, entire and abruptly cuneate at the base, lateral leaflets oval, 3.5–4.5 cm. long, 1.7–3.5 cm. broad, crenate-dentate to serrate near the apex, entire and obtuse at the base; inflorescence a terminal compound spike about 6 cm. long, 3 cm. broad, bracts broadly ovate, 1 mm. long, 1.8 mm. broad, densely pubescent on both surfaces, glabrate near apex on the outer surface, ciliate with simple and glandular hairs; flowers almost sessile; sepals ovate, 0.8 mm. long, 0.8 mm. broad, glabrous on both surfaces, not ciliate, persistent; petals ovate, 1.5 mm. long, 0.8 mm. broad, glabrous on both surfaces, not ciliate; fruit red, about 5 mm. long, 5 mm. broad, pubescent with simple and glandular hairs.

A species with much variation, yet easily recognizable throughout its range. While related to *R. schmideloides,* the only plant it is likely to be confused with is *R. trilobata* var. *serotina* (Greene) Barkl. It seems probable that there has been hybridization between the two species where their ranges overlap. In its westward range the leaves of *R. aromatica* become smaller.

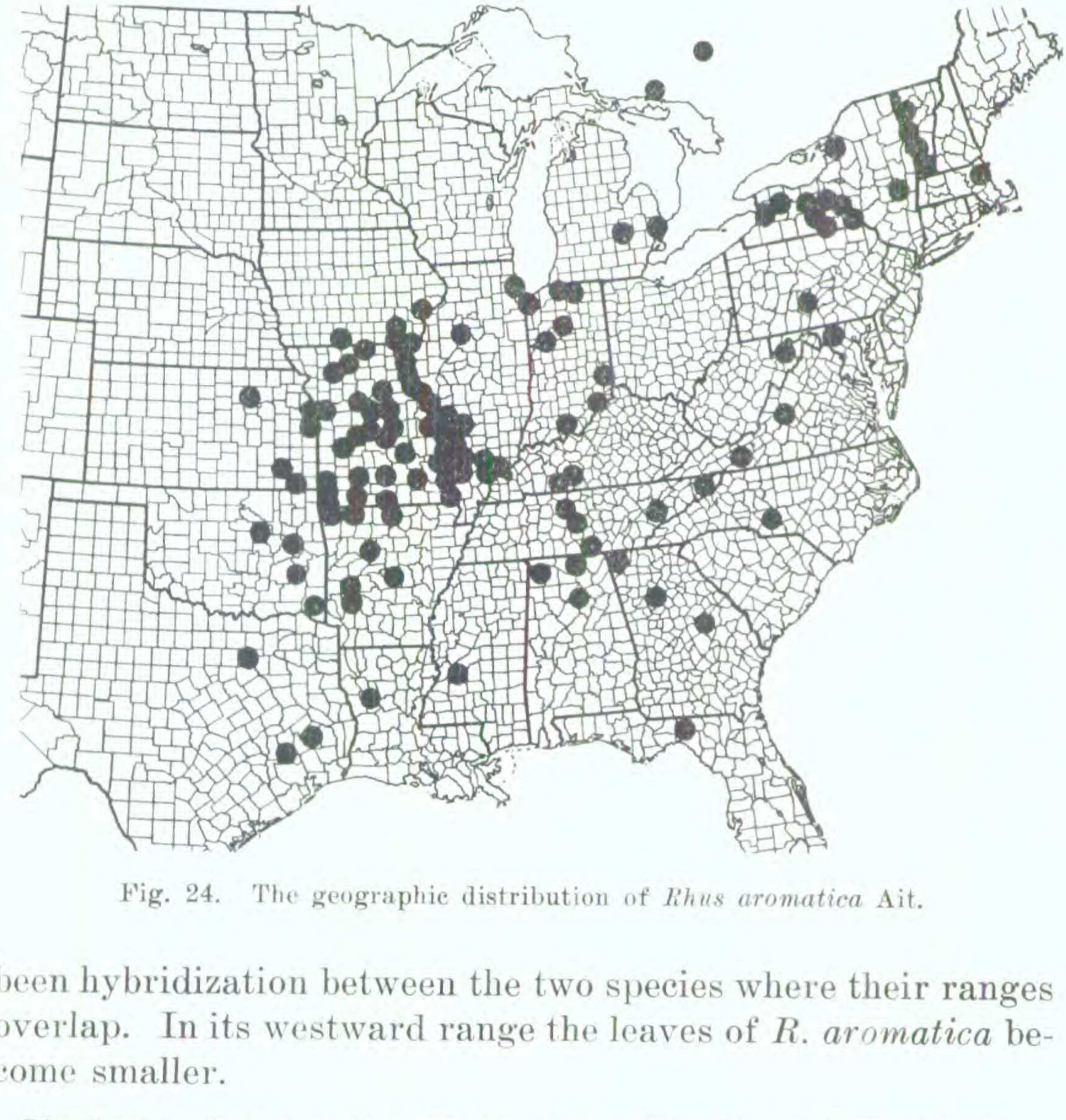

Fig. 24. The geographic distribution of *Rhus aromatica* Ait.

Distribution: Quebec, south to Florida, west to Nebraska and Texas (fig. 24).

CANADA:

QUEBEC: Ile Lemieux, valley of the Ottawa, Aug. 27, 1924, *Rolland-Germain 13022* (M).

ONTARIO: Shannonville, June 2, 1884, *Fowler* (M).

UNITED STATES:

VERMONT: Snake Mountain, Weybridge, Aug. 7, 1896, *Eggleston* (F); Pownal, June 25, 1931, *Carpenter* (CA); North Pownal, Aug. 1, 1898, and May 9, 1902, *Churchill*, July 25, 1898, *Eggleston* (M); Charlotte, April 19, 1878, and June 1, 1879, *Horsford* (F); Benson, June 27, 1923, *Knowlton* (M).

MASSACHUSETTS: Arnold Arboretum, Jamaica Plain, 1922, *Blazic* (CA).

NEW YORK: Glenmont, May 25, and Aug. 4, 1929, *House 16099* (M); Choconut Ravine, 1885, *Millspaugh* (F); Chemung Co., June 16, 1895, and May 6, 1897, *Heller 7776* (F); Sullivan Hill, May 11, 1879, *Lucy 1678* (F); Buffalo, *Clinton* (F); "North Woods," Le Roy, July 4, 1893, *Hill 51* (F); north side of Black River, 2 miles east of Brownville, July 8, 1931, *Muenscher & Maguire 2381* (M); Henderson, Aug. 1896, *Tidestrom* (ND); Dexter, *ex Vasey Herb.* (M); Ontario Co., 1828–1834, *Hall* (F); Ovid, May 22, 1858, *Brewer & Chickering* (F); Fall Creek Ithaca, July 31, 1893, *von Schrenk*, and May 24, 1878, *Trelease* (M); north of Esty, July 6, 1918, *Wiegand 10243* (M); Penn Yan, *Sartwell* (M).

PENNSYLVANNIA: Huntingdon Co., July 1878, *Porter* (F).

MARYLAND: Emmitsburg, *Foreman* (F).

VIRGINIA: Lexington, May 19, 1881, *Churchill*, and Natural Bridge, May 30, 1891 (M); Natural Bridge, April 27, 1886, *Kennedy 7* (RMt); Wytheville, 18??, *Schriver* (F).

NORTH CAROLINA: falls of Yadkin River, Aug. 18, 1892, *Small* (F); Stanly Co., Aug. 18, 1891, *Small & Heller* (F).

GEORGIA: middle Georgia, March 1843, *Rugel* (M); Stone Mountain, May 20, 1897, *Eggert*, May 30, 1933, *Miller, Perry, Boyd & Myers 543* (M); Stone Mountain, alt. 1600–1630 ft., Sept. 6–12, 1894, *Small*, DeKalb Co., May 1–8, 1895, Currahee Mountain, alt. 900–1800 ft., Sept. 1–3, 1894 (F); Chickamauga Park, near Chattanooga, Tennessee, May 27, 1911, *Churchill* (M); northwest of Sandersville, June 13, 1902, *Harper 1329* (F, M, cotype of *S. crenata*).

FLORIDA: Jefferson Co., June–July 1898, *Hitchcock 338* (F).

ALABAMA: Blount Springs, May 5, 1898, *Baker* (F, RMt); Tuscumbia, July 20, 1899, *Eggert* (M); Huntsville, *Mohr* (F); Huntsville, July 1891, *Shimek* (F).

MISSISSIPPI: Jackson, April 18, 1927, *Woodson & Anderson 1547* (M).

LOUISIANA: Natchitoches, April 24, 1915, *Palmer 7362* (CA, M).

WEST VIRGINIA: near Burlington, Aug. 21, 1930, *Berkley 1655* (M).

MICHIGAN: near Pleasant Lake, June 1, 1910, *Ehlers 822* (M); near Port Huron, May 7 and June 22, 1895, *Dodge* (F, M).

INDIANA: Fitch's Glenn, about 4 miles west of Logansport, May 18, 1928, *Deam 45717*, Blue River, 1 mile south of Milltown, Oct. 5, 1920, St. Joseph River about 1.5 miles northwest of Bristol, July 7, 1920, *31355*, along White Water River, west of Cedar Grove, May 19, 1919, *27530*, and along the Ohio River about 4 miles east of Madison, June 20, 1915, *16239* (Deam); shore of Lake Michigan, Roby, May 17, and Sept. 11, 1898, *Lansing 158* (F); St. Joseph River west of the Elkhart County line, May 25, 1923, *Deam* (Deam); 4-mile Bridge, northwest of Notre Dame, Aug. 28, 1925, and June 20, 1929, *Nieuwland* (ND); 4-mile Bridge, St. Joseph River, Oct. 12, 1930, *Nieuwland & Just* (ND); near Big Wea Creek about 4 miles southwest of Lafayette, June 4, 1927, *Deam 44460* (Deam); West Lafayette, May 23, 1912, *Overholts* (M).

Kentucky: coll. of 1840, *Short* (M), coll. of 1859 (F); Russelville, June 5, 1920, *Palmer 17740* (M); Bowling Green, June 1890, *Price* (M).

Tennessee: near Nashville, Aug. 12, 1897, *ex Biltmore Herb. 869a* (M); Cumberland Mountain, July 21, 1897, *Eggert* (M); along Tennessee River, Knoxville, May 1895, *Ruth* (F, RMt); Knoxville, June 1896, *Ruth*, April and June 1898, *31*, *3* (M); near Murfreesboro, April 22, 1929, *Palmer 35491* (M); limestone bluff, Bluff City, May 20, 1934, *Underwood 774* (ND).

Illinois: 1873, *Brendel* (US type of *S. illinoensis*); June 20, 1875, *Eggert* (M); McClure, Sept. 29, 1919, *Palmer 16619* (CA, M); Kenilworth, June 15, 1908, *Calkins 295* (F); Evanston, May 30, 1890, *ex Letterman Herb.* (M); Tunnel Hill, May 17, 1919, *Palmer 15184* (M); Peoria, April and June 1900, *McDonald* (RMt); Grassland, Aug. 20, 1887, *Pammel* (M); Alto Pass, May 2, 1919, *Palmer 15013* (CA, M); Cobden, June 8, 1885, *Waite* (US type of *S. formosa*).

Iowa: Decatur Co., Oct. 14, 1897, *Anderson* (M, RMt); near Fairfield, May 19, 1929, *Palmer 35824* (M); Keokuk, July 5, 1895, *Shimek* (F); Moscow, 18??, *Hitchcock* (M); Muscatine, Sept. 10–12, 1898, *Pammel & Reppert 1217* (M); Pittsburg, June 14, 1902, *Shimek* (M).

Missouri: Bush Station, Aug. 11, 1914, *Davis 2991* (M); bluffs of the Osage, Warsaw, Aug. 26, 1897, *Trelease 250* (M); near Lutesville, April 26, 1931, *Palmer 39106* (M); Hinkson Creek on Black's Mill Road, south of Columbia, May 21, 1933, *Drouet 409* (M); Columbia, June 3, 1928, *Kellogg 1852* (M); Poplar Bluff, Aug. 6, 1897, *Savage & Stull* (F); Dumas, Aug. 25, 1921, *Bush 9521*, and July 27, 1923, *10127* (M); Jefferson City, *Krause* (M); Cooper Co., Sept. 30, 1934, *Bush 14145* (M, ND), and *14146* (ND); near Pattonsburg, June 15, 1924, *Palmer 25469* (M); Elmont, May 23, 1914, *Emig 247* (M); Gray Summit, May 19, 1928, *Greenman 4536* (M); Pacific, June 13, 1897, *Trelease 249* (M); Greene Co., April 27 and May 26, 1888, *Blankinship* (M); near Trenton, June 15, 1924, *Palmer 25489*, near Ironton, May 17, 1923, *22652* (M); Shut-in, Arcadia, May 8, 1925, *Woodson 377* (M); Swope Park, Kansas City, June 13, 1937, *Barkley 1150* (ND); campus, Kansas City University, June 14, 1937, *Barkley 1* (ND); Independence, June 18, 1895, *Bush 62*, Vale, June 8, 1906, *3928*, Dodson, Oct. 4, 1906, *4162*, Oct. 11, 1921, *9728*, Greenwood, Oct. 3, 1923, *10225*, Swope Park, Kansas City, Oct. 6, 1923, *10230*, and Courtney, June 2, 1931, *12117* (M); Carterville, Aug. 5 and 10, 1906, *Palmer 873*; Webb City, March 15, 1909, *1597*, and May 3, 1909, *1866*, Jasper, May 6, 1909, *1900* (M); Turkey Creek, Joplin, Oct. 7, 1897, *Trelease 252* (M); Kimmswick, May 1862, *Engelmann* (M); near Festus, May 31, 1926, *Mathias 533* (M); 3 miles northwest of Festus, June 20, 1929, *Steyermark 1104* (M); Kimmswick, April 12, 1885, *Wislizenus 59* (M); Wyaconda River, La Grange, Oct. 31, 1914, *Davis 3497*, *3497A*, and Whiteside, Sept. 12, 1911, *993* (M); Noel, May 2, 1914, *Palmer 5461* (M); St. Francis River, near Silvermine, May 20, 1927, *Greenman* (M); Lanes Prairie, May 8, 1934, *Bush 13492* (M); Hannibal: Aug. 28, 1911, *Davis 718*, Mark Twain's Cave, June 10, 1913, *348*, Ely Street, May 4, 1914, *2332*, north of town, May 30, 1914, *2646*, south of town, May 16, 1921, *3509* (M); Mississippi bluffs, Helton, June 16, 1917, *4519* (M); between Iberia and Tuscumbia, July 4, 1934, *Steyermark 13006* (M); Morgan Co., Sept. 30, 1934, *Bush 14179* (M, ND), and *14180* (ND); 4 miles southwest of Joplin, May 28, 1923, *Palmer 22927* (M); Shoal Creek, near Joplin, Oct. 7, 1897, *Trelease 253* (M); near Bakersfield, Oct. 7, 1927, *Palmer 32865*, and "Bald Jesse," near Gainesville, June 26, 1928, *34756* (M); Perry Co., along Shawanee Springs branch (Taylor Springs branch) of Cinq Hommes Creek, about 3 miles south of Perryville, July 29, 1934, *Steyermark 13970* (M); Jerome, May 4, 1913, *Kellogg 384* (M); Eolia, May 26, 1914, *Davis 2418* (RMt), May 29, 1916, *1238*, and Minor's farm, near Eolia, June 25, 1917, *7615* (M); between Livonia and Unionville, July 2, 1933, *Palmer & Steyermark 41099* (M); south of Oakwood, Oct. 9, 1914, *Davis 3708* (M); Redgeville, April–Aug. 1899, *Jenson 14* (M); Osceola, July 28, 1933, *Bush 12805* (CA, M); Flat River, Oct. 13, 1897, *Trelease 254, 255, 256* (M); Ste. Genevieve, June 23, 1920, *Palmer 18029* (M); near Webster Groves, Nov. 1926, *Bettis* (M); Meramec Highlands, May 14, 1918, *Churchill* (M); Valley Park, Nov. 9, 1936, *Cutler 607* (M); Mincke, May 19, 1918, *Drushel 4028* (M); St. Louis, June 20, 1875, and April 24, 1877, *Eggert*, near Allenton, May 2, 1896, (M); Windsor Springs, May 30, 1890, *Hitchcock* (M); Meramec Highlands, July 29, 1905, *Johnson* (M); Cliff Cave, July 22, 1898, *Kellogg* (M); Allenton, March and May 1880, *Letterman*, March 25, 1880 (CA), and May 20, 1880 (M); Meramec Highlands, June 13, 1909, *Ohlweiler*, Oct. 12, 1905, *Shannon 222a*, and June 26, 1910, *Sherff 79* (F); May 2, 1925, *Bush 14730*, Herndon, May 2, 1935, *14740*, and Montier, Aug. 4, 1927, *11442* (M); near Galena, Sept. 25, 1923, *Palmer 23880*, and April 30, 1924, *24582* (M); Piedmont, Sept. 1897, *Russell* (M); Williamsville, Sept. 9, 1897, *Trelease 251* (M); 6 miles north of Cedar Gap, alt. 1675 ft., May 22–June 3, 1911, *Lansing 2960*, 1 mile south of Cedar Gap, May 22–June 3, 1911, *2990* (F).

ARKANSAS: Cotter, Sept. 1, 1915, *Palmer 8411* (CA, M); Benton Co., *Plank* (M); Eureka Springs, April 24, 1928, *Nelson 10903* (RMt); Pope Creek, May 1, 1927, *Ashe* (CA); Langley, Oct. 5, 1932, *Demaree 9511* (M); near Nogo, Oct. 19, 1932, *Merrill 96* (M); cross-roads, about a mile south of Sleepy Hollow filling-station on Highway 10, Pulaski Co., April 29, 1935, *Lodewyks, 233* (M).

KANSAS: Olathe, Oct. 3, 1934, *Bush 14227* (M); 4 miles west of Oswego, June 27, 1929, *Rydberg & Imler 318* (M); Miami Co., May 20, 1885, *Oyster* (CA); Riley Co., April 25, 1895, *Norton 74* (RMt cotype of *S. Nortonii*), and Oct. 12, 1895, *74a* (M, RMt, US), and Sept. 21, 1895, *Clothier 74b* (RMt); near Neodesha, Oct. 31, 1923, *Palmer 24359* (M).

OKLAHOMA: Devil's Promenade, Sept. 18, 1921, *Bush 9629*, Sapulpa, July 30, 1894, *190* (M); Gowen, June 12, 1930, *Clark 2705* (Okla); North Hairpin Bend, Highway 21, McCurtain Co., June 7, 1930, *Little & Olmsted 123* (Okla); Muskogee Co., May 22, 1927, *Little*, June 18, 1927, and Aug. 24, 1927, *3164* (Okla).

TEXAS: Buzzard Spring, Aug. 1, *Reverchon 7*, and Angelina Bottom, May 7, 1903 (M); Dallas, May 10, 1900, *Bush 689* (M); east of the Trinity River, May, 1874, *Reverchon 149* (M); Willis, *Warner* (M); Livingston, April 12, 1914, *Palmer 5211* (M).

41. Rhus trilobata Nutt. ex Torr. & Gray, Fl. N. Am. **1**: 219. 1838.

Rhus trilobata var. *glaberrima* Engler in DC., Monogr. Phaner. **4**: 386. 1883.

R. aromatica var. *trilobata* Gray, Am. Jour. Sci. II. **33**: 408. 1861.

R. Osterhoutii Rydb., Fl. Rocky Mts. & Adj. Plains, p. 551, 1064. 1917.

R. oxyacanthoides Rydb., *ibid.*
Schmaltzia trilobata Small, Fl. Southeast. U. S., pp. 728, 1334. 1903.
S. Bakeri Greene, Leafl. Bot. Obs. & Crit. **1**: 132. 1905.
S. botryoides Greene, *ibid.* 138.
S. cognata Greene, *ibid.* 141.
S. elegantula Greene, *ibid.* 136.
S. glabrata Greene, *ibid.* 132.
S. glauca Greene, *ibid.* 138.
S. glomerata Greene, *ibid.* 140.
S. hirtella Greene, *ibid.* 137.
S. leiocarpa Greene, *ibid.* 133.
S. oxyacanthoides Greene, *ibid.* 134.
S. quercifolia Greene, *ibid.* 141.
S. sabulosa Greene, *ibid.* 135.
S. subpinnata Greene, *ibid.* 133.
S. tridophylloides Greene, *ibid.* 141.
S. pubescens Osterh., Muhlenbergia **7**: 11. 1911.
Toxicodendron trilobatum Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891.
T. triphyllum var. *trilobatum* forma *glaberrimum* Kuntze, *ibid.*

Shrub 0.3–1.5 m. high; twigs slender, bark gray, the new branches tan, puberulent, the older glabrate; leaflets 3, subcoriaceous to thin, subrevolute, glabrous and green above, barely pubescent below, crenate, with about 3 entire or crenate-dentate lobes near the rounded apex, subemarginate to submucronate, entire near the cuneate base, sessile, terminal leaflet obovate, 2 cm. long, 1.5 cm. broad, lateral leaflets obovate, 1 cm. long, 1 cm. broad; petiole 0.5 cm. long; inflorescence a dense compound spike, bracts deltoid, 1.5 mm. long, 1.7 mm. broad, densely pubescent on the outer surface, glabrous on the inner surface, ciliate with non-glandular hairs, persistent; flowers numerous, pedicels about 2.5 mm. long; sepals deltoid-lanceolate, 1.2 mm. long, 0.4 mm. broad, rounded at the apex, glabrous, ciliate with non-glandular hairs, persistent; petals yellowish in the dried state, obovate, 2.7 mm. long, 1.5 mm. broad, glabrous on the outer surface, pilose on the inner surface, not ciliate; anthers oval, 0.6 mm. long, 0.6 mm. broad, filaments about as long as the sepals; fruit 6 mm. long, 7 mm. broad, somewhat flattened, red, covered with a layer of short red glandular hairs and sparsely pilose with simple hairs; seed 5 mm. long, 3.5 mm. broad, slightly roughened.

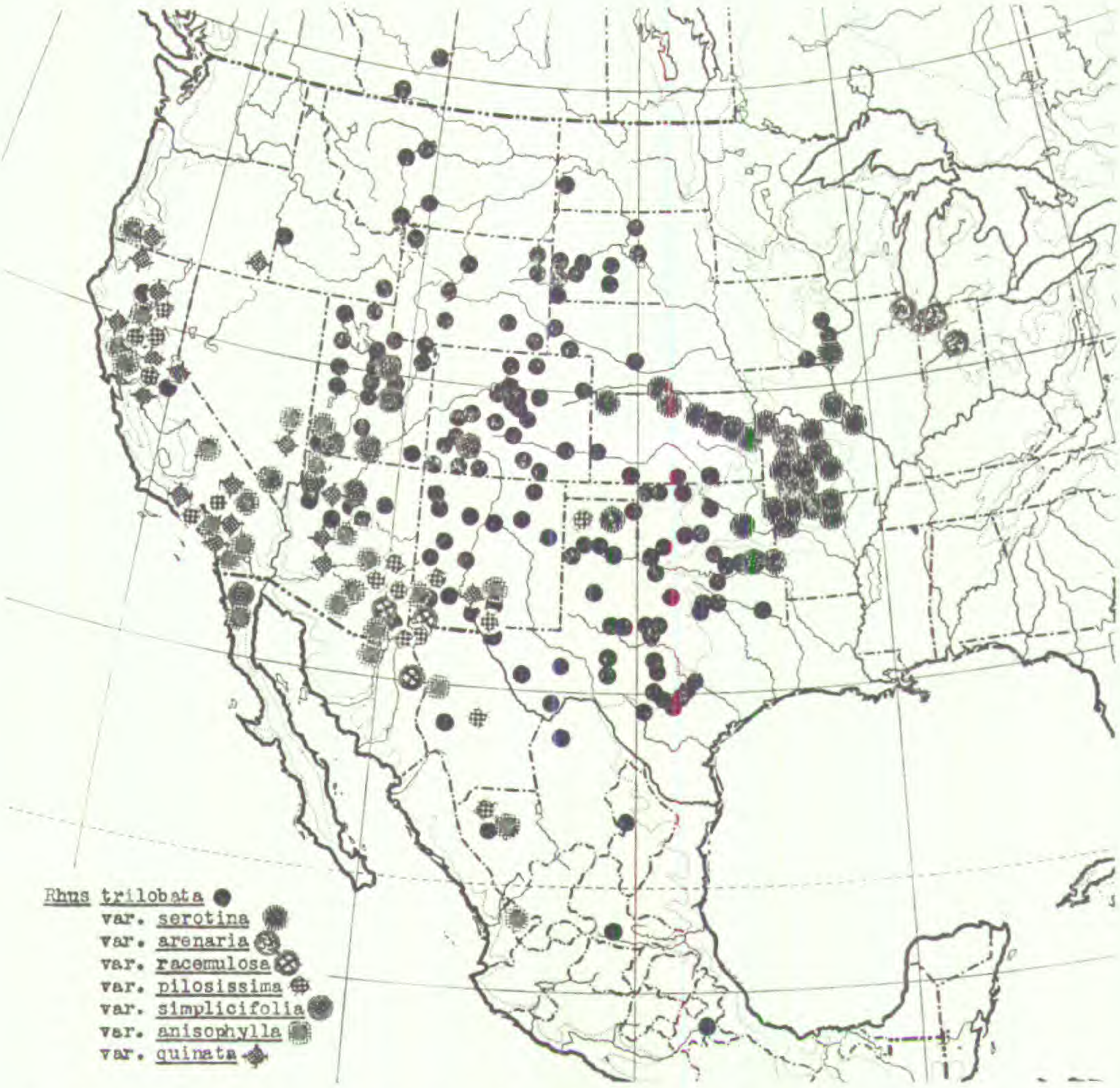
Rhus trilobata ●
var. serotina
var. arenaria
var. racemulosa
var. pilosissima
var. simplicifolia
var. anisophylla
var. quinata

Fig. 25. The geographic distribution of *Rhus trilobata* Nutt. and its varieties.

An extremely variable assemblage of plants probably best treated taxonomically as a single polymorphic species running into several more or less consistent geographic variations.

Distribution: Iowa, Alberta, and California, to south-central Mexico (fig. 25).

CANADA:

ALBERTA: Medicine Hat, June 5, 1894, *Macoun 4075*, Milk River, July 9, 1895, *10075* (M).

SASKATCHEWAN: South Saskatchewan, Sept. 5, 1880, *Macoun 78* (F).

UNITED STATES:

IOWA: Davis Co., July 18, 1895, *Fitzpatrick* (F); Cedar Rapids, May 15, 1896, *Shimek* (F, M), Big Sand Mount, northeast part of Louisa County, July 19, 1922 (M).

NORTH DAKOTA: Medora, June 19, 1900, *Bergman* (Okla); near Medora, Aug. 16, 1927, *Larsen 179* (M).

SOUTH DAKOTA: Bald Hills, Black Hills National Forest, June 8, 1910, *Murdock 4090* (F); without definite locality, *Thornber 551* (F); Peno Hills, Aug. 1891, *Williams* (M); Pinean Hills, Aug. 7, 1891, *Williams & Wilcox* (M); Hill Canyon, 8 miles northeast of Dewey, July 28, 1927, *Hayward 2471* in part (RMt), Hot Springs, Aug. 15, 1926, *453* (F); Hot Branch Canyon, near Hot Springs, Aug. 6, 1928, *McIntosh 1042* (RMt); July 28, 1911, *Visher 2558* (RMt); Missouri Valley, Pierre, *ex Herb. Coulter* (F); Spearfish Canyon, Aug. 1 and 2, *Hayward 113, 174* (F); near Piedmont, June 8, 1929, *Palmer 37014* (M); Black Hills near Fort Meade, Sept. 1, 1887, *Forwood 59* (US type of *S. glabrata);* Piedmont, May and July 1895, *Pratt* (F); Bad Lands, Pennington Co., 5 miles south of Scenic, Aug. 22, 1926, *Hayward 580* (F), Rapid City, June 12, 1927, *751, 791* (RMt), and May 10, 1925, *Lee 519* (RMt); Bad Lands near Wall, June 15, 1929, *Palmer 37263* (M); Black Hills, Rockerville, June, 1910, *White* (M); Fort Pierre, 1853–1854, *Hayden* (M); Swan Creek, Aug. 1, 1911, *Visher 3349* (M), Bear Creek, July 8, 1911, *2074* (F).

NEBRASKA: coll. of 1853–1854, *Hayden 192,* and forks of the Platte, July 8, 1858 (M); Sidney, May 23, 1922, *Nelson* (RMt); 9 miles south of Gothenburg, May 30, 1931, *Morrison 1027* (M); Scotts Bluff Co., Aug. 13, *Baker* (M).

KANSAS: near Medicine Lodge, July 22, 1933, *Palmer 41835* (M); Cowley Co., April 1898, *White* (M); Syracuse, July 15, 1893, *Thompson 120* (M); Seward Co., Aug. 29, 1897, *Hitchcock 1106* (M, RMt, cotypes of *S. quercifolia,* M photo.); 12 miles east of Liberal, July 11, 1929, *Rydberg & Imler 870* (M).

OKLAHOMA: "Indian Territory," April 23, 1877, *Butler* (M); on the upper Canadian River, April 1864, *Gordon 92* (M); Salt Fork of the Arkansas River, 5.5 miles north of Cherokee, June 21, 1930, *Jackson 335* (Okla); Limestone Gap, April 23, 1871, *Butler 78* (M), and 11 miles north of Limestone Gap, April 23, 1877, *40* (F); prairie, top of Devils Canyon, Sept. 27, 1936, *Little 3903* (ND); 3 miles west of Norman, May 1, 1928, *Barkley* (Okla); Norman, April 20, 1924, *Bruner,* and 2 miles southwest of Norman, April 20 and July 5, 1924 (Okla); Norman, Oct. 3, 1914, *Emig 367* (M); near the South Canadian River, near Norman, May 26, 1922, *Jeffs* (Okla); Norman, May 1, *Kitchens 48* (Okla); near the South Canadian River, April 29, 1924, *Vincent 67* (Okla); Cleveland Co., April 29, 1901, *White* (RMt); west of Minco, July 3, 1928, *Myers 72* (Okla); near Hornbeck's, May 3, 1913, *Stevens 268* (M); north bank of Red River, 5.5 miles southwest of Eldorado, March 27, 1927, *Little 535* (Okla); Devil's Den, near Tishomingo, May 27, 1931, *Palmer 39434* (M); Mountain Park, Kiowa Co., July 17, 1903, *Duncan 40* (M); Frank's Conglomerate Peak, Arbuckle Mts., *Fielder* (Okla); Price's Falls, April 30, 1926, *Stratton 6* (M); Cimarron River near Perkins, June 14, 1893, *Waugh 131* (M, US type of *S. tridophylloides);* near Cora, May 28, 1913, *Stevens 766* (M); Cedar Top, Sept. 2, 1936, *Eskew 1355* (Okla); Cache, July 26, 1936, *Kaieser* 6 (Okla); 5 miles west of Snyder, Oct. 23, 1936, *Hopkins 846* (Okla); Chickasha, April 22, 1936, *Osborn 469 E* (Okla).

TEXAS: Pinto Canyon, near Rindosa, April 13, 1919, *Hanson* (M); western

Texas, 1890, *Nealley* (F); valley of Trinity River, April 4–May 20, 1912, *Ruth 357* (M); Paloduro Canyon, May 31, 1902, *Reverchon* (M); Paloduro, Sept. 14, 1917, *Young* (M); near Coyote Lake, Bailey Co., Aug. 25, 1921, *Ferris & Duncan 3442* (CA, M); San Antonio, June 28, 1911, *Clemens* (CA), and *831* (M); Bracken, June 26, 1903, *Groth 1* (F); coll. of 1903, *Jermy* (M); San Antonio, March 16, 1916, *Palmer 9191* (CA, M); Upper Blue Creek Canyon, Chisos Mts., alt. 1520 m., July 1, 1931, *Moore & Steyermark 3326* (CA, M); Chisos Mts., June 19, 1931, *Mueller 8066* (M); near Brownwood, Oct. 3, 1924, *Palmer 26759*, and Clyde, May 30, 1918, *13808* (M), and *13809* (CA, M); Comal Co., Oct. 1846, *Lindheimer 230, 347*, New Braunfels, May 1848 (M), and Comanche Spring, May 1849, *733* (F, M, Okla); near Comanche, May 9, 1900, *Eggert* (M); Dallas, April 16, 1900, *Bush 612*, and May 10, 1900, *688* (M); near Dallas, June 23, 1899, *Eggert*, and May 3, 1900 (M); Dallas, June 15, 1898, *ex Glatfelter Herb.* (M); Dallas Co., April and May 1892, *Purpus 62* (F); Dallas, March and May, *Reverchon (Curtiss 499)* (F, M), May 1876, and June 1880 (F); El Paso, 1881, *Vasey* (F), and April 1881 (M); Hudson Mountain, *ex Jermy Herb. 87* (M); Denison, Oct. 28, 1933, *Creighton & Gilchrist* (M); Longview, April 2, 1915, *Palmer 7126* (CA); Estelline, July 8, 1903, *Reverchon 3813*, and "Red River," Estelline, May 25, 1904 (M); San Marcos, Nov. 6, 1897, *Irelean* (M); near Canadian, June 7, 1901, *Eggert*, and Granbury, May 7, 1900 (M); Davis Mts., Oct. 4, 1926, *Palmer 31928* (M); Limpia Canyon, April 24, 1902, *Tracy & Earle 258* (F, M, ND); Spanish Pass, May 23, 1916, *Palmer 9866* (CA, M); Kerrville, alt. 1600–2000 ft., April 25–30, 1894, *Heller 1658* (F, M); Llano, April 19, 1931, *Fisher 38* (F); Lubbock, near Posey, 1930, *Demaree 7764* (M); near Colorado, June 8, 1900, *Eggert* (M); Nolan Co., Aug. 3, 1934, *Barkley* (M); Sheffield, April 13, 1930, *Jones 25652* (M); "Red River," Randall Co., Aug. 13, 1900, *Eggert* (M); Sonora Exp. Sta., Sutton Co., alt. 700 m., July 13, 1920, *Eggleston 16688* (F); Tarrant Co., June 2, 1920, *Ruth 357* (F); San Angelo, March 29, 1917, *Palmer 11403* (CA); Austin, May 8, 1872, *Hall* (F), *75* (M); Austin, April 1, 1916, *Palmer 9328*, Uvalde, March 22, 1917, *11346* (CA, M); Rio San Pedro, 1851, *Wright 917* (US type of *S. sabulosa*); Pease River bottoms near Vernon, Aug. 20, 1921, *Ferris & Duncan 3349* (CA, M); Belknap, March 9, 1858, *Hayes 111* (F); Graham, Oct. 28, 1902, *Reverchon* (M).

MONTANA: Black Eagle Falls, Great Falls, July 22, 1885, *Anderson* (F); Bozeman, alt. 4500 ft., May 5, 1906, *Blankinship 667* (RMt); Bozeman, May 18, 1901, *Jones 67* (RMt); Helena, July 7, 1909, *Butler 4123* (CA); 1 mile northwest of Fish Creek, Sweet Grass Co., *Hitchcock 2351* (CA).

YELLOWSTONE NATIONAL PARK: Red Mountain, Whiskey Gap, June 16, 1932, *Hanna 1002* (M); Gardiner River, June 18, 1902, *Mearns* (F); near Table Mountain, June 2, 1894, *Nelson 159*, and along the Gardiner River, July 19, 1899, *5964* (M).

WYOMING: without definite locality, June 8, 1892, *Buffum 170* (RMt); Blue Grass Hills, July 8, 1894, *Nelson 3063 (322)*, Platte Plains and Hills, July 13, 1894, *446* (ND, RMt); Naturita, alt. 5400 ft., April 20, 1914, *Payson 235* (RMt); between Sheridan and Buffalo, June 15–July 15, 1900, *Tweedy 3533* (RMt); Kemp Creek Hills, July 20, 1910, *Willits 440* (RMt); east of Laramie, June 21, 1891, *Buffum* (RMt); Sand Creek, July 29, 1929, *Greenman 6015* (M); Laramie Peak, Aug. 7, 1895, *Nelson 1477* (RMt), and Sand Creek, May 31, 1900, *6983* (M, RMt); east of Laramie, June 1, 1902, *Shellon 57* (RMt); Beulah, Aug. 3, 1926, *Hayward 228* (F); Pole Creek Canyons, June 2, 1894, *Nelson 159* (ND, RMt); near Cheyenne, June 25, 1896, *Greene* (ND); Pinebluff, May 15, 1897, *Nelson 2881* (RMt); Leucite Hills, June 17, 1901, *Merrill & Wilcox 704* (RMt); Green River, May 31, 1897, *Nelson 3065* (F), and Worland, Aug. 1909, *9300* (RMt); Newcastle, July 9, 1927, *Hayward 2028* in part (F, RMt).

COLORADO: Trail Glen, alt. 2150 m., July 22, 1901, *Clements 32* (M, RMt); Horsetooth Gulch, May 15, 1897, *Crandall 1251* (RMt); Pawnee Buttes, July 1, 1906, *Dodds 2099* and *2106* (RMt); Mesa Verde National Park, July–Aug. 1913, *Haas 11* (RMt); Wickiup Cañon, Mesa Verde National Park, alt. 6400 ft., May 30, 1925, *Schmoll 1643* (RMt); Ute Pass, June 30, 1886, *Trelease* (M); Mesa Verde National Park, July 1, 1935, *Zobel* (M); Littleton, Aug. 30, 1923, *Pammel* (Okla); Arboles, alt. 6000 ft., June, 1899, *Baker 456* (F, M, ND, RMt), and June 10, 1899 (ND); hillside, Pagosa Springs, Aug. 13, 1917, *Payson 1155* (M, RMt); Piedra, along trail to Chimney Rock, June 21, 1924, *Schmoll 1215*, and Devils Creek, July 7, 1924, *1377* (RMt); Rule Creek, Bent Co., May 22, 1913, *Osterhout* and *4876* (RMt); Boulder, May 1900, *Archibald A165* (RMt); west of Sanitarium, Boulder, June 5, 1917, *Johnston & Hedgcock 802* (RMt); near Boulder, June 1899, *Ramaley A62* (RMt); Blue Bell Canyon, near Boulder, June 18, 1906, *Robbins 1583* (RMt); near Boulder, July 1902, *Tweedy 4948* (RMt); Buena Vista, June 18, 1918, *Eastwood 7093* (CA); Salida, June 27, 1917, *Payson 1012* (M); near Empire, 1875, *Greene* (ND); Berkeley, Denver, June 13, 1916, *Bethel 9*, and July 16, 1916, *8* (CA); Inspiration Point, June 26, 1918, *Churchill* (M); along Clear Creek, Denver, Aug. 7, 1910, *Eastwood 22* (CA, M); 3 miles south, 2 miles east of the Chase Ranch, Sedalia, July 12, 1917, *Johnston & Hedgcock 790* (RMt); Sedalia, 3 miles east to Castle Rock, July 12, 1917, *Johnston 790* (M); Garden of the Gods, Colorado Springs, Aug. 17, 1915, *Drushel 3164* (M); Manitou, Sept. 9, 1905, *ex Glatfelter Herb.*, and South Cheyenne Cañon, Sept. 11, 1905 (M); Garden of the Gods, Colorado Springs, Sept. 18, 1899, *Holm* (F); Colorado Springs, June 23, 1879, *Jones* (RMt); Colorado Springs, July 19, 1872, *Redfield 427* (M); Williams Canyon, Aug. 17, 1927, *Woodson 1879* (M); Cañon City, Sept. 7, 1896, *Greene* (ND type of *S. subpinnata*); southeast of La Veta, May 18, 1900, *Rydberg & Vreeland 5909* (RMt); Golden, May 27, 1916, *Eastwood 5408* (CA); Durango, July 20, 1898, *Baker, Earle & Tracy 525* (M, ND, cotypes of *S. cognata*); Durango, May 21, 1916, *Eastwood 5306* (CA); Fort Collins, alt. 5000 ft., May 15 and July 9, 1896, *Baker* (M, cotype of *S. Bakeri*); May 15 and July 6, 1896, *Earle* (F); along Masonville road, west of Fort Collins, June 20, 1929, *Mathias 358* (M); Trinidad, June 13, 1916, *Eastwood 5553, 5583* (CA); Deer Run, Aug. 25, 1901, *Baker 919* (ND); Gunnison Mesa, Grand Junction, May 15, 1916, *Eastwood 5069*, and Grand Junction, June 21, 1918, *7228* (CA); Grand Junction, Aug. 27, 1896, *Greene* (ND type of *S. oxyacanthoides*, M photo.); Dolores, July 28, 1917, *Payson 1121* (RMt), *1121A* (M); Cimarron, alt. 6900 ft., July 11, 1901, *Baker 406*, (M, ND, RMt); Cedar Creek, near Montrose, July 9, 1917, *Payson* (M), *1043* (M, RMt), alt. 5000 ft., July 14, 1924, *3931* (RMt); Paradox, alt. 5400 ft., June 19, 1912, *Walker 122* (RMt); "Mill," Nast, July 1918, *Schedin* (RMt); open prairie, 11 miles south of Pueblo, June 8, 1922, *Wiegand & Upton* (F); Norwood Hill, alt. 7000 ft., Aug. 10, 1912, *Walker 414* (M, RMt); northwest of Grover, May 24, 1926, *Johnston 198* (RMt); Wray, July 1–4, 1919, *Eggleston 15214* (F).

NEW MEXICO: White Sands, May 4, 1933, *Castetter 2122* (RMt); Puije Indian Ruins, Oct. 14, 1928, *Eastwood 15541* (CA); Balsam Park, Sandia Mts., alt. 8300 ft., April 15, 1914, *Ellis 254* (M); without definite locality, May 1847, *Fendler 99a* (F), *112* (M); Santa Clara Canyon, July 1, 1936, *Marcelline 1854* (F); near the Cimarron, Santa Fe road, June 15, 1846, *Wislizenus 474* (M); O-O Canyon, Datil National Forest, alt. 2100 m., Sept. 27, 1919, *Eggleston 16146* (F); 11 miles west of Datil, Datil National Forest, alt. 8300 ft., July 3, 1918, *Ferris 1211* (CA); Warm Spring, south of the Mogollon Mts., alt. 4000 ft., July 6, 1900, *Wooton* (M); Cimarron, June 2, 1931, *Nelson 11505* (RMt); near Ute Park, Cimarron River, Oct. 7, 1934, *O'Byrne & Magner 3414, 3415, 3416, 3417* (M); Dripping Springs, May 1926, *Child 552* (M); west of the Organ Mts., March 24, 1895, *Wooton* (RMt), and Mesilla, alt. 3900 ft., June 21, 1897, *48* (M, RMt, cotypes of *S. leiocarpa*); Silver City, 1911, *Beard* (M); Silver City, April 3, 1919, *Eastwood 8196*, and May 3, 1919, *8406, 8407* (CA); Mangas Springs, 18 miles northwest of Silver City, alt. 4700 ft., April 22, 1903, *Metcalfe 420* (RMt); Central, July 23, 1895, *Mulford 404* (M); along Gila River, April–July 1881, *Rusby 72* (F, M); Gallup, June 14, 1916, *Eastwood 5610* (CA); head of Rio Fresnol, Alamo National Forest, Aug. 12, 1911, *Barlow* (F); Sacramento Mts., Alamogordo, alt. 4600 ft., April 14, 1902, *Rehn & Viereck* (RMt); Tularosa Creek, 3 miles south of Mescalero, July 19, 1928, *Wold 2805* (CA); Nara Visa, April 21, and Aug. 22, 1911, *Fisher* (RMt); Jemez Springs, Aug. 4, 1931, *Nelson 11571*, and University Field School Camp, Jemez Springs, Aug. 15, 1931 (RMt); Aztec, April 27, 1899, *Baker* (ND); Las Vegas, June 26, 1895, *Mulford 35* (M); 15 miles west of Santa Fe, alt. 6000 ft., May 22, 1897, *Heller 3571* (M, ND); north of Percha, Black Range, alt. 6000 ft., July 12, 1914, *Metcalfe 1119* (CA, F); Water Cañon, Magdalena Mts., July 13, 1910, *Herrick 53* (F); Water Canyon, west of Socorro, April 14, 1925, *Nelson 10174* (RMt); Acomita, alt. 4000 ft., May 14, 1932, *Castetter 1421* (RMt).

ARIZONA: Padre Cañon, Oct. 21, 1928, *Eastwood 15763* (CA); Campbell's Ranch, Azucar Mts., April 15, 1931, *Jones 78973* (M); Willow Springs, 1874, *Rothrock 203* (F); Frick Park, Bisbee, June 5, 1915, *Carlson* (CA); Cave Creek Canyon, Chiricahua Mts., alt. 4000–5000 ft., Aug. 24–26, 1927, *Kusche*, and alt. 6000–8000 ft., June 26–29, 1927 (CA); Painted Desert, near Tuba, July 15–31, 1920, *Clute 105* (M, RMt); GRAND CANYON OF THE COLORADO RIVER:—trail from Grand View, Sept. 26–28, 1913, *Eastwood 3643*, Hermit Trail, April 9, 1917, *5941*, and Indian Gardens, April 14, 1917, *6098, 6099* (CA); July 10, 1892, *Wooton* (US type of *S. hirtella*);—Mount Eden, near Flagstaff, June 6, 1923, *Hanson A557* (CA); near Flagstaff, alt. 7000 ft., July 15, 1898, *MacDougal 295* (F, RMt); Flagstaff, May 1893, *Wilson* (US type of *S. elegantula*); Gila Co., Aug. 27, 1936, *Little 4287* (M, ND); Fort Apache, July 26, 1910, *Goodding 680* (RMt); Navajo Co., June 21–30, 1890, *Palmer 590* (US type of *S. botryoides*), and Walnut Grove and Prescott, April 20 and 28, 1876, *9982 (60, 61)* (M).

IDAHO: Shoshone Falls, June 5, 1912, *Bennitt 129* (RMt); along Snake River, May 22, 1911, *Macbride 868* (F); Twin Falls and Shoshone Falls, July 26, 1911, *Nelson & McBride 1350* (F, M); coll. of 1892, *Sandberg 1008* (CA); Shoshone Falls, May 27, 1899, *Trelease & Saunders 4390* (M); Pocatello, May 27, 1893, *Palmer 44* (US), and July 22, 1893, *396* (US type of *S. glomerata*); Payette, Snake River bluffs, alt. 2000 ft., May 22, 1911, *Macbride 868* (M), and May 22, 1911, *Nelson 868* (RMt).

UTAH: Zion National Park, July 10, 1928, *Dunham* (F); without definite locality, June 25, 1918, *Eastwood 7702* (CA); without definite locality, June–July

1869, *Eaton 112* (CA); without definite locality, coll. of 1875, *Ward 6* (F); near Beaver Dam, alt. 6500 ft., May 30, 1913, *Redeker 38* (RMt); Logan Cañon, July 18, 1898, *Mulford 187* (M); Helper, Aug. 4, 1899, *Trelease 4391* (M), Red Cañon, June 20, 1933, *Eastwood & Howell 778* (CA); Green River flats, near Flaming Gorge, alt. 5500 ft., May 30, 1932, *Williams 457* (CA, M); Nephi, June 17, 1933, *Eastwood & Howell 579* (CA); MacIntyre Ranch, west of Nephi, July 9, 1928, *Harris C28225*, and west of Holden, July 18, 1921, *C21743*, and June 25, 1928, *C2827* (M); Simonson's Ranch, alt. 5000 ft., June 17, 1933, *Maguire & Becraft 2686* (M); Marysvale, alt. 6000 ft., May 31, 1894, *Jones 5338g* (M); along Bullion Creek above Marysvale, July 21, 1905, *Rydberg & Carlton 7026* (RMt); near Emigration Canyon, near Salt Lake City, June 9, 1908, *Clemens* (F), and Fort Douglas, Oct. 4, 1909 (RMt); Salt Lake City, Aug. 16, 1902, *Cooper 410* (RMt); Salt Lake City, June 1872, *Engelmann* (M); Wasatch foothills near Salt Lake City, April 14, 1930, *Fisk* (M); City Creek Cañon, near Salt Lake City, July 25, 1930, *Palmer 38032* (M); Ensign Mountain, Salt Lake City, alt. 5000 ft., July 12, 1902, *Pammel & Blackwood 3565* (CA, M); Armstrong and White Canyons, near the Natural Bridges, alt. 1600–1800 m., Aug. 4–6, 1911, *Rydberg & Garrett 9449* (RMt); Fountain Green, Aug. 23, 1928, *Harris C28834* (M); Glenwood, May 8, 1875, *Ward 6* (F); near highway west of Echo City, July 19, 1929, *Goodman 759* (M); Tooele, Aug. 7, 1928, *Harris C28632* (M); Uinta Basin, June 12, 1929, *Phelps* (CA); on road to Mt. Timpanogos, June 15, 1933, *Eastwood & Howell 408* (CA); St. George, March 29, 1880, *Jones 1608* (F).

CALIFORNIA: Roscoe, near Los Angeles, May 27–June 10, 1906, *Eastwood 227*, and San Gabriel Canyon, May 29, 1919, *8953* (CA); Bootjack, Oct. 11, 1931, *Howell 8137* (CA); Big Bend, Henderson P. O., May 8, 1923, *Bethel* (CA).

MEXICO:

CHIHUAHUA: Majalca, Aug. 24, 1935, *LeSueur M205*, and Santa Clara Canyon, Oct. 10–19, 1935, *M428* (F); southwest of San Ysidro, District of Guerrero, May 14, 1929, *Mexia 2529* (CA, M), and May 16, 1929, *2535* (CA).

COAHUILA: Canyon de Sentenela on Hacienda Piedra Blanca, Sierra del Carmen, July 8, 1936, *Wynd & Mueller 613* (M).

DURANGO: Durango, April–Nov. 1896, *Palmer 785* (US type of *S. glauca*); Tepehuanes, March 25–April 16, 1906, *Palmer* 15 (F).

NUEVO LEON: Mesa Canyon, near Monterey, July 1933, *Mueller 96* (F).

PUEBLA: Cerro Amaluguilan, Dec. 6, 1906, *Arsène* (US); Cerro de Baxtle, July 1907, *Purpus 2725*, near San Luis Tultitlanapa, near Oaxaca, July 1908, *Purpus* in part (Calif).

SAN LUIS POTOSI: Alvarez, May 19–22, 1905, *Palmer 586* (F).

41a. Rhus trilobata var. **serotina** (Greene) Barkley, n. comb.

Rhus canadensis var. *serotina* Palmer & Steyerm., Ann. Mo. Bot. Gard. **22**: 591. 1935.

Schmaltzia lasiocarpa Greene, Leafl. Bot. Obs. & Crit. **1**: 141. 1905.

S. serotina Greene, *ibid.* 131.

A large shrub; leaflets large, thin, terminal 4–9 cm. long, 5–8 cm. broad, crenate-dentate or lobed above, puberulent, subrevolute-margined; fruit 6 mm. in diameter, densely pilose and glandularly pubescent.

A fairly uniform variety with fruit characters similar to the species, and with leaf characters intermediate between those of the species and *R. aromatica* Ait.

UNITED STATES:

IOWA: skunk-cabbage bog, northwest of Bayfield, May 26, 1923, *Shimek*, and 8 mi. northwest of Muscatine, June 9, 1928 (M).

MISSOURI: Fairy Cave, April 26, 1935, *Bush 14657* (M); Myer's Spur, May 3, 1909, *Palmer 1866* (M); Eagle Rock, May 28, 1898, *Bush 259*, Aug. 12, 1905, *3225*, and Shell Knob, May 27, 1936, *15598*, *15599* (M); near Washburn, June 3, 1926, *Palmer 30468* (M); along Roaring River in Roaring River State Park, May 11, 1934, *Steyermark 7799* (M); Roaring River, Sept. 7, 1898, *Trelease 968* (M); Cole Camp, May 10, 1926, *Palmer 30036* (M); Hinkson Creek on Black's Mill Road south of Columbia, May 21, 1933, *Drouet 408* (M); along Sac River below mouth of Bear Creek and Alder Branch, northeast of Stockton, July 14, 1934, *Steyermark 13478* (M); near Turnback, May 5, 1929, *Palmer 35608* (M); Grand River, 3 mi. northeast of Piney, Oct. 8, 1934, *Steyermark 15979*, along Pomme de Terre River, east of Doran Spring, 3 mi. south of Hermitage, July 12, 1934, *13396* (M); Swope Park, Kansas City, June 14, 1937, *Barkley* (ND); Independence, May 6, 1894, *Bush 148* (M, ND **type**), Grain Valley, May 7, 1899, *92*, Vale, June 8, 1906, *3927*, Greenwood, Sept. 19, 1906, *4139*, and May 10, 1912, *6676*, Dodson, Oct. 11, 1921, *9729*, Swope Park, May 4, 1923, *10033*, and May 11, 1923, *10050*, *10052*, *10054*, also May 21, 1923, *10064*, *10066*, June 9, 1924, *10244*, *10244A*, *10249*, and June 20, 1924, *10258*, *10259* (M); near Buzzards Nest, Swope Park, Kansas City, April 29, 1917, *Hoffmann* (M); Swope Park, Kansas City, June 13, 1937, *Clark* (ND); Grand View, May 18, 1917, *Hoffmann* (M); Grain Valley, May 7, 1899, *Mackenzie* (RMt); Webb City, May 5, 1901, *Palmer 706*, Carterville, April 14, 1907, *1109*, and April 28, 1909, *1805*, near Oronogo, June 16, 1923, *23347*, North Fork of Spring River, near Alba, May 15, 1926, *32127* (M); Festus, April 28, 1932, *Kellogg 25843* (M); along Gasconade River northwest of Hazel Green, May 3, 1934, *Steyermark 7797* (M); Noel, April 24, 1909, *Bush 5512* (M); Noel, May 2, 1914, *Palmer 5463* (M); along Osage River south of Mary's Home, July 5, 1934, *Steyermark 13117*, along Missouri River south of Lupus, Aug. 22, 1934, *14773*, South Fork of Salt River, north of Victor, Nov. 4, 1934, *16347*, Osage River near mouth of Procter Creek, July 7, 1934, *13176* (M); near Pontiac, Oct. 11, 1927, *Palmer 33093* (M); "Bald Jesse," about 6 miles northwest of Gainesville, June 9, 1933, *Steyermark 8396* (M); Jerome, May 4, and June 22, 1913, *Kellogg 380* (M); Pomme de Terre River, 0.5 mi. north of Burns, July 17, 1934, *Steyermark 13591*, and along Piney Fork near Hooker, May 4, 1934, *7798* (M); Osage River near Osceola, May 6, 1929, *Palmer 35643* (M); Allenton, alt. 500 ft., April 10, 1880, *Letterman 83* (F); Stone Co., April 25, 1936, *Bush 14656*, and April 29, 1936, *15321*, also Baxter, May 27, 1936, *15608*, *15609*, and Reeds Spring, June 9, 1936, *15673* (M); James Fork of White River near Galena, April 29, 1924, *Palmer 24577* (M); central Stone County, Sept. 15, 1898, *Trelease 968* (M); Walnutshade, April 29, 1936, *Bush 15301* (M); Branson, June 5, 1914, *Palmer 5874*

(F, M), and Swan Creek near Forsyth, June 4, 1931, *39496* (M); Jack's Fork of Current River, 4.5 mi. southeast of Arroll, Aug. 16, 1934, *Steyermark 14586* (M).

ARKANSAS: Cotter, Oct. 27, 1913, *Palmer 4752* (RMt), *4754,* and Sept. 1, 1915, *8411,* and White River near Cotter, Sept. 18, 1924, *26207* (M); Sulphur Springs, May 5–6, 1928, *Demaree 4988,* and east of Garfield, May 5 and 12, 1929, *6629* (F, M); Blue Springs, April 16, 1928, *Moore & Demaree 4782* (M); Eureka Springs, Sept. 20, 1913, *Palmer 4384,* and May 7, 1925, *27040* (M); Van Buren, April 5, 1929, *Demaree 6410* (F); near Batesville, April 22, 1926, *Palmer 29767* (M); Marion Co., April 24, 1924, *Bush 13350* (M).

NEBRASKA: Republican Valley, May 14, 1894, *Laybourne 88* (M).

KANSAS: Douglas Co., Oct. 3, 1934, *Bush 14269* (M, ND); McDowell Creek, Oct. 13, 1935, *Gates 18776* (M); Olathe, Oct. 3, 1934, *Bush 14229* (ND), also La Cygne, Sept. 19, 1934, *14001* (M, ND), and April 23, 1936, *15264* (M), also Louisburg, Sept. 19, 1934, *14038* (M, ND); near Osborne City, June 9, 1894, *Shear 104* (US type of *S. lasiocarpa);* Atwood, May 9, 1891, *Fry* (M); Manhattan, June 22, 1893, *Dorman* (ND), and 1887, *Kellerman* (M).

OKLAHOMA: near Broken Bow, May 13, 1930, *Sears 1378* (Okla); Muskogee Co., April 17, 1927, *Little 550,* and *734* (Okla).

TEXAS: Gamble's Ranch, June 4, 1918, *Palmer 13896* (CA, M).

41b. Rhus trilobata var. **arenaria** (Greene) Barkl., n. comb.
Schmaltzia arenaria Greene, Leafl. Bot. Obs. & Crit. **1:** 130. 1905.

A low shrub with very slender branches; leaflets narrowly ovate-cuneate, about 2.2 cm. long, 1.7 cm. broad, crenate-dentate towards the obtuse apex, subrevolute; fruit about 6 mm. in diameter, pubescent with glandular hairs, and densely pilose with simple hairs.

A rather constant variety, mostly of the sand dunes of the Great Lakes region.

UNITED STATES:

INDIANA: near Lake, *Blatchley* (Deam); shore of Lake Michigan, Miller, May 16, 1899, *Chase 1067* (M); shore of Lake Michigan, near Chicago, Sept. 4, 1893, *Churchill* (M); near Miller, Aug. 14, 1911, *Deam 9578,* south of Pine, Sept. 15, 1923, *39749* (Deam); Miller, May 9, 1878, *Grassley* (F); Whiting, June 7, 1899, *Lansing 586,* and Clarke, June 4, 1900, *868,* and Aug. 5, 1900, *1103,* Edgemoor, June 4, 1903, *1702,* Clarke Junction, June 15, 1903, *1765,* Edgemoor, July 24, 1906, *2501,* also Pine, May 23, 1908, *2711* (F); Miller, May 1, 1911, *Nieuwland 2653* (ND), June 2, 1911, *854, 854a* (M, ND); Miller, Sept. 4, 1911, *Sherff* (F); Clarke, May 15, 1897, *Umbach* (F, **cotype**), May 15 and June 19, 1897 (F); south of Lake Michigan, July 1893, *White 16759* (M); Clark, June 14, 1897, *ex Moore Herb.* (RMt); 5 miles north of Chesterton, Aug. 22, 1915, *Deam 17998* (Deam); Mineral Springs, May 29, 1913, *Nieuwland 11053,* and June 6, 1915, also Dune Park, May 19, 1929 (ND).

ILLINOIS: Edgebrook, 1908, *Duesner* (F); World's Fair site, shore of Lake Michigan, Chicago, May 16, 1891, *Moffatt* (M).

41c. Rhus trilobata var. **racemulosa** (Greene) Barkl., n. comb.

Schmaltzia racemulosa Greene, Leafl. Bot. Obs. & Crit. **1**: 142. 1905.

S. scaberula Greene, *ibid.* 138.

A shrub with very slender branches, usually finely puberulent to glabrous; leaflets bluntly rhombic-ovate, mostly 3.5–4 cm. long, crenate-dentate toward the apex, entire near the rather abruptly cuneate base; flowers with pedicels usually exceeding 5 mm. in length; flowering in July and August.

UNITED STATES:

NEW MEXICO: 27 mi. south of Animas, Animas Range, July 9, 1928, *Wolf 2575* (CA).

ARIZONA: Bonita Canyon, Chiricahua Mts., alt. 6000 ft., Aug. 19, 1906, *Blumer 1324*, and Nov. 2, 1906, *1321* (F, M); near Fort Huachuca, Aug. 1894, *Wilcox 378* (US type).

MEXICO:

CHIHUAHUA: near Colonia Garcia, Sierra Madre, alt. 7500 ft., July 29, 1899, *Townsend & Barber 191* (Calif, F, M, ND, RMt).

SONORA: Cochuto, alt. 5000 ft., Oct. 2, 1890, *Hartman 80* (US type of *S. scaberula*).

41d. Rhus trilobata var. **pilosissima** Engler in DC., Monogr. Phaner. **4**: 386. 1883.

Rhus Canadensis var. *mollis* Gray in Patterson, Check-list, p. 21, 1892.

R. aromatica var. *mollis* Ashe, Bot. Gaz. **24**: 377. 1897.

R. Emoryi Wooton ex Greene, Leafl. Bot. Obs. & Crit. **1**: 134. 1905.

Schmaltzia anomala Greene, *ibid.* 139.

S. Emoryi Greene, *ibid.* 133.

S. malacophylla Greene, *ibid.* 138.

S. pulchella Greene, *ibid.* 134.

Leaflets rhombic-ovate, crenate-dentate near the blunt apex, entire near the rather abruptly cuneate base; fruit large; new branches and leaflets densely ferruginous-pilose.

UNITED STATES:

TEXAS: Amarillo, May 29, 1902, *Reverchon 3058* (M).

NEW MEXICO: Puije Indian Ruins, Oct. 14, 1928, *Eastwood 15556* (F), and along road from Albuquerque to Gallup, Oct. 18, 1928 (CA); Van Patten's, Organ

Mts., June 11, 1906, *Standley* (M); Organ Mts., June 11, 1906, *Wooton* (RMt), alt. 4800 ft., Sept. 1, 1897, *584* (M, ND cotype of *R. Emoryi* and of *S. Emoryi*); Organ Mts., 1852, *Wright 1342* (US type of *S. pulchella*); Mangas Springs, 18 mi. northwest of Silver City, alt. about 4300 ft., April 22, 1903, *Metcalfe 25* (ND); near Silver City, March and July 1880, *Rusby 71* (F); Magdalena, base of Blue Mts., June 20, 1921, *Ferris & Duncan 2294* (CA).

Arizona: Senvita Valley, May 1880, *Lemmon* (F); Hall's Ranch, Whitetail Canyon, Chiricahua Mts., Aug. 22, 1906, *Blumer 1319* (F, M); Pinal Mountains, Oct. 26, 1928, *Eastwood 15884* (CA); Gila Co., Oct. 14, 1936, *Little 4288*, and Oct. 25, 1936, *4201* (M, ND); Fort Grant, June 15, 1912, *Goodding 1053* (RMt); Apache Trail and adjacent regions, Oracle, May 25, 1929, *Eastwood 17463* (CA, M photo.).

California: Little Chico Creek, 1883, *Austin* (ND type of *S. anomala)*, Butte Co., March and April 1896, *767* (M), April 1883 (F); along Rock Creek, 12 mi. northeast of Chico, March 19, 1915, *Heller 11773* (CA); Mokelumne Hill, *Blaisdell* (CA); Glenn Co., May 26, 1914, *Heller 11429* (F, ND); Griffith Park, April 13, 1902, *Braunton 203* (US), and June 11, 1902, *487* (US type of *S. malacophylla);* Pasadena, May 1901, *Grant 1119* (F); Los Angeles Co., May 5, 1912, *Smith 4934* (F); Capell Creek, between St. Helena and Putah Creek Canyon, March 20, 1923, *Wriglet* (CA); San Bernardino, 1881, *Parish 550* (F); Anderson, April 2, 1913, *Smith* (CA).

MEXICO:

Chihuahua: west of the City of Chihuahua, Oct. 10–19, 1935, *LeSueur M431* (F); near the City of Chihuahua, June 5–10, 1908, *Palmer 338* (F).

Durango: Tepehuanes, June 4–25, 1906, *Palmer 313* (Calif, F, M).

Jalisco: Sierra de Nayarit, June 28, 1855, *Schott* in part (F).

41e. Rhus trilobata var. **simplicifolia** (Greene) Barkl., n. comb.

Rhus canadensis var. *simplicifolia* Greene, Bull. Torr. Bot. Club **17**: 13. 1890.

R. utahensis Goodding, Bot. Gaz. **37**: 57. 1904.

Schmaltzia affinis Greene, Leafl. Bot. Obs. & Crit. **1**: 135. 1905.

S. cissodes Greene, *ibid.* 136.

S. simplicifolia Greene, *ibid.* 135.

S. ribifolia Greene, *ibid.* **2**: 156. 1911.

Leaves ovate to oval, crenulate-margined or lobed, sometimes deeply lobed near the base or even trifoliolate, more or less light glaucous-green, 1.5–3.5 cm. long, 1.5–3.5 cm. broad, short-petiolate; fruit sparsely pubescent.

A rather uniform variety, much resembling *R. trilobata* var. *anisophylla* Jepson in leaf characters, other than in number of leaflets.

UNITED STATES: southern Utah, northern Arizona, coll. of 1877, *Palmer 81* (M).

OKLAHOMA: Limestone Ridge, 11 mi. north of Limestone Gap, April 23, 1877, *Butler* (M).

COLORADO: western Montrose County, alt. 5000 ft., July 14, 1924, *Payson 3932* (M).

ARIZONA: Navajo Indian Reservation, July 1916 (M); GRAND CANYON OF THE COLORADO RIVER:—Bright Angel Trail, Sept. 26, 27 and 28, 1913, *Eastwood 3763* (CA), Grand View Trail, June 16, 1916, *5695* (CA, M), Hermit Trail, April 9, 1917, *5974*, Hermit Creek, April 10, 1917, *5976*, Hermit Trail, April 11, 1917, *6034*, Bright Angel Trail, May 6, 1917, *Meiere* (CA), near Indian Gardens, Bright Angel Trail, May 10, 1903, *Merriam* (US type of *S. cissodes);* Kaibab Trail to Roaring Springs, Grand Canyon National Monument, June 23, 1933, *Eastwood & Howell 1016* (CA);—Peach Springs, 1889, *Greene* (ND).

UTAH: San Rafael, April and May 15, 1931, collector unknown *5621*, *5624* (M); Kanab, alt. 5300 ft., April 22, 1894, *Jones 5236e* (M, cotype of *S. affinis);* Diamond Valley, May 16, 1902, *Goodding 832* (M, cotype of *R. utahensis);* Santa Clara Valley, April 30, 1894, *Jones 5132* (M).

MEXICO: San Matias Pass, San Pedro Martir Mts., June 28, 1905, *Goldman 1187* (US type of *S. ribifolia).*

LOWER CALIFORNIA: El Rancho Viejo, April 30, 1889, *Brandegee* (Calif); Topo Canyon, July 27, 1883, *Orcutt 26 (8951)* (Calif).

41f. Rhus trilobata var. **anisophylla** Jepson, Man. Fl. Pl. Calif., p. 608. 1925.

Schmaltzia anisophylla Greene, Leafl. Bot. Obs. & Crit. **1**: 136. 1905.
S. cruciata Greene, *ibid.* 139.
S. hederacea Greene, *ibid.* 135.
S. Oregana Greene, *ibid.* 140.
S. puncticulata Greene, *ibid.* 137.
S. straminea Greene, *ibid.* 139.
S. trinervata Greene, *ibid.* 137.

Leaflets broadly ovate, cuneate-dentate, rounded or subacute at apex, abruptly cuneate at the base, terminal leaflet 1–6 cm. long, 0.8–4.5 cm. broad, lateral leaflets 0.5–3 cm. long, 0.5–3 cm. broad; fruit large.

A rather uniform variety, more or less merging into the species in the eastern portion of the range and into variety *simplicifolia* in the Rockies.

UNITED STATES:

NEW MEXICO: Silver City, 1911, *Beard* (M); Alamogordo, Aug. 6, 1931, *Fisher 43* (F).

ARIZONA: Fish Creek, Apache Trail, May 19, 1919, *Eastwood 8749*, Burro Creek, Aquarine Mts., May 14, 1931, *18381* (CA); Cameron, alt. 5800 ft., June 8, 1922, *Hanson A170* (F, M); *Voth 70* (F); Hall's Ranch, Whitetail Canyon, Chiricahua Mts., Aug. 22, 1906, *Blumer 1320* (F); Bisbee, May 31, 1915, *Carlson* (CA); North Fork of Pinery Canyon, 2–4 mi. above junction with South Fork, Chiricahua Mts., alt. 6000–7000 ft., July 17, 1919, *Stone 648* (RMt); edge of Painted Desert, Oct. 20, 1928, *Eastwood 15718*, Kaibab Trail to Roaring Spring, Grand Canyon National Monument, June 23, 1933, *Eastwood & Howell 1015* (CA); San Francisco Mts., Sept. 2, 1889, *Knowlton 170* (US type of *S. trinervata);* Grand Canyon of the Colorado River, *Millspaugh 135* (F); Collom Camp, Mazatzal Mts., alt. 1200 m., March 15 and June 15, 1935, *Collom 351* (M, M photo.); Pinal Mts., Oct. 26, 1928, *Eastwood 15870*, along road from Packard to Payson, Nov. 1, 1928, *16615*, on road to Payson, Nov. 3, 1928, *16663* (CA); 5 mi. south of Pine, July 1, 1928, *Wolf 2465* (CA); Union Pass, May 31, 1893, *Wilson* (ND type of *S. puncticulata);* Lower Trail, Rincon Mts., Oct. 15, 1909, *Blumer* (F); Santa Rita Mts., May 27, 1881, *Pringle* (F); Oracle, May 25, 1929, *Eastwood 17462* (CA); 20 mi. east of Fort Whipple, July 15, 1865, *Coues & Palmer 287* (M); Prescott, May 20, 1919, *Eastwood 8794* (CA); Walnut Grove, April 1876, *Palmer 60*, and Prescott, March and April 1876, *61* (F); half-mile east of Prescott, alt. 5000 ft., June 28, 1928, *Wolf 2353* (CA).

NEVADA: Mica Spring, alt. 4000 ft., April 14, 1894, *Jones 5064m* (M cotype of *S. hederacea);* Kyle Canyon, Charleston Mts., May 25, 1919, *Tidestrom 9607* (F); Karshaw, Meadow Valley Wash, April 26, 1902, *Goodding 614* (RMt).

UTAH: St. George, Nov. 5, 1922, *Nelson 9995* (RMt).

OREGON: Grant's Pass, May 27, 1884, *Howell* (F cotype of *S. Oregana),* April 20, 1887 (F, ND).

CALIFORNIA: near Brewery Springs, Surprise Canyon, Panamint Mts., alt. 1550 m., April 13, 1891, *Coville & Funston 618* (US type); Surprise Canyon, Panamint Mts., alt. 5300 ft., June 12, 1930, *Ferriss 7983* (M); Mt. Sanhedrin, June 1917, *Reynolds* (CA); Acton, Mt. Gleason, June 1902, *Elmer 3680* (F); Vermont Canyon, Griffith Park, Los Angeles, March 2, 1928, *Howell 3364*, and St. Helena Creek below Patten's, March 28, 1926, *1769* (CA); along Lyttle Creek, San Gabriel Reserve, alt. 800 m., April 27, 1898, *Leiberg 3338* (US type of *S. straminea);* March 26 and 27, 1932, *Dunn & Martin* (M); Vandeventer Flats, Santa Rosa Mountain, Oct. 6, 1912, *Smith 5469* (F); New York Mts., Ivanpah, April 21, 1932, *Ferris & Bacigalupi 8080* (CA, ND); 49 Palms Canyon, near 29 Palms, June 13, 1931, *Hoffmann* (CA); Highland Avenue, east of Upland, alt. about 1000 ft., June 11, 1927, *Howell 2478* (CA); near Bonanza King Mine, East Slope, Providence Mts., Mohave Desert, alt. 4000 ft., May 21–24, 1920, *Munz, Johnston & Harwood 4048* (RMt); Moore's Ranch, 15 mi. south of Cima, alt. 4500 ft., June 28, 1931, *Stark* (CA); San Diego Co., April 23, 1920, *Eastwood 9436, 9473* (CA); San Diego, March 23, 1882, *Jones 3090* (CA, M); Hot Springs, July 24, 1875, *Palmer 46* (F, M cotype of *S. cruciata);* west of Paynescreek, May 2, 1924, *Heller 13856* (F).

MEXICO:

CHIHUAHUA: east of Pearson, Sierra Madre, July 25, 1911, *Barlow* (F); southwest of San Ysidro, District of Guerrero, May 14, 1929, *Mexia 2529*, and May 16, 1929, *2535* (Calif).

DURANGO: between San Julian and Cerro Prieto, alt. 7000–8500 ft., Sept. 9, 1898, *Nelson 4947* (US).

Jalisco: Sierra de Nayarit, June 28, 1855, *Schott* in part (F).

Lower California: 15–20 mi. east of Ensenada, on road to Ojos Negros, Sept. 14, 1929, *Wiggins & Gillespie 4052* (CA, F, M).

Sonora: Cananea, Sept. 1, 1909, *Donnelly 38* (Calif); Cochuto, alt. 5000 ft., Oct. 2, 1890, *Hartman 80* (Penn); San José Mts., 5 mi. south of Naco, alt. 6000 ft., July 6, 1928, *Wolf 2507* (CA).

41g. Rhus trilobata var. **quinata** Jepson, Erythea **1**: 141. 1893.

Rhus Canadensis var. *quinata* Gray, Syn. Fl. N. Am. **1**: 386. 1897.

Schmaltzia quinata Greene, Leafl. Bot. Obs. & Crit. **1**: 139. 1905.

Leaflets glabrate, crenate to crenate-dentate near the blunt apex, terminal leaflet fan-shaped, usually deeply 3-lobed, 2–5 cm. long, 2–5 cm. broad, basal leaflets obovate, crenate, 1–3 cm. long, 0.6–3 cm. broad.

A variety similar to var. *anisophylla*, from which it is readily distinguished by usually having larger leaflets, the terminal of which is commonly dissected into three divisions.

UNITED STATES: coll. of 1845, *Fremont's Expedition to California 49* (M).

New Mexico: head of Rio Fremal, Alamo National Forest, Aug. 12, 1911, *Barlow* (CA).

Arizona: Bright Angel Creek, Grand Canyon of the Colorado River, June 20, 1916, *Eastwood 5892* (CA); Maricopa Co., *Booth 94* (ND); near Prescott, Nov. 6, 1928, *Eastwood 16691* (CA).

Nevada: Karshaw, Meadow Valley Wash, April 26, 1902, *Goodding 614* (M), and Snow Springs, April 5, 1905, *2153* (RMt).

Oregon: Grant's Pass, April 20, 1887, *Howell 1107* (M); banks of Snake River, Ontario, May 3, 1896, *Leiberg 2005* (CA).

California: coll. of 1860–1867, *Bolander* (F); on the Klamath River, Aug. 20, 1880, *Engelmann* (M); Mint Canyon, April 24, 1926, *Epling* (M); Quail Spring, Morongo Mts., March 10, 1928, *Howell 3399* (CA); canyon of Big Chico Creek, March 19, 1914, *Heller 11212* (CA, F, M, ND); Big Sandy Creek, April 1–5, 1915, *McDonald*, and Huntingdon Lake, July 1926 (CA); west of Willows, April 23, 1922, *Eastwood 11178* (CA); on the Newville-Covelo road, July 7, 1914, *Heller 11533* (CA, F, M, ND); Kelseyville, April 17, 1928, *Blankinship* (M), and Mt. Konocti, July 22, 1928 (CA); Mt. Sanhedrin, May 23, 1925, *Eastwood 12898* (CA); without definite locality, Aug. 25, 1888, *Greene* (ND); on Eel River 1 mi. below Hullville, Aug. 4, 1902, *Heller 6026* (F, M, RMt); Kelseyville, April 1, 1931, *Jussel*, and Jordan Park, Cobb Mountain, April 30, 1933, and between Cobb Mountain and Adams Springs on the Binkley Ranch, June 27, 1933, *227* (CA); Santa Monica Mts., April 1901, *Abrams 1310*, Sepulveda Canyon, March 11, 1902, *3113* (M); Claremont, May 5, 1904, *Baker 4734* (M); Aliso Canyon, Santa

Monica Mts., June 26, 1897, *Barber 191* (RMt); Acton, June 1902, *Elmer 3680* (M); Griffith Park, Los Angeles, May 18, 1925, *Epling* (M); near Lancaster, April 10, 1927, *Hart* (CA); Claremont, April 1912, *Howery* (M); Wilmington, March 1923, *Whited 945* (ND); North Fork and vicinity, May 30–June 8, 1903, *Griffiths 4463* (M); Tiburon, Aug. 1923, *Walther* (CA); Mariposa, Sept. 27, 1903, *Congdon* (M); Pope Valley Creek 4 mi. east of Samuels Springs, Napa Range, May 30, 1929, *Howell 4266* (CA); St. Helena, April 1, 1921, *Hunt* (CA); Conn Creek, Napa River basin, May 1, 1894, *Jepson* (ND); San Jacinto Canyon, alt. 3000 ft., April 3, 1918, *Parish 11698* (M); Santa Rosa Mountain, 1912, *Smith 5469* (M); Banning, May 28, 1928, *Van Dyke* (CA); San Bernardino, April and June 1888, *Parish* (M), and March and July 1889 (F); Warner Springs, April 18, 1913, *Eastwood 2819*, Descanso, June 26, 1919, *9185* (CA); Oakrun, May 21, 1894, *Baker & Nutting* (ND); Cayton, May 8, 1923, *Bethel* (CA); Millville, June 26, 1912, *Eastwood 679* (CA); Mt. Shasta, alt. 5000–10000 ft., Aug. 1–15, 1897, *Brown 595* (F, M); near Yreka, 1910, *Butler 1615* (M, RMt, M photo.); west of Paynescreek, May 11, 1924, *Heller 13856* (M); near Indian Creek, alt. 1250 ft., April 11–16, 1919, *Ferris 1531* (CA); Nordhoff, April 12, 1916, *Eastwood 4937, 4952* (CA).

MALOSMA (Nutt.) Engler

Malosma Engler in DC., Monogr. Phaner. **4**: 393. 1883, in syn.; de Dalla-Torre & Harms, Gen. Siph., p. 287. 1907, in syn.; Abrams, Fl. Los Angeles, p. 220. 1917.

Lithraea Miers, Trav. Chili **2**: 529. 1826, in part; Endl., Gen. Pl., p. 1130. 1840, sect. MALOSMA; Ench. Bot. p. 599. 1841, sect. MALOSMA; Walp. Rep. Bot. Syst., p. 551. 1842, sect. MALOSMA; Abrams, Bull. N. Y. Bot. Gard. **6**: 403. 1908.

Rhus Nutt. ex Torr. & Gray, Fl. N. Am. **1**: 219. 1838, sect. MALOSMA; *ibid.* **1**: 681. 1840, as subgenus LITHREA; Gray, Syn. Fl. N. Am. **1**^{1}: 383. 1897, sect. MALOSMA; Standl., Contr. U. S. Nat. Herb. [Trees & Shrubs Mex.] **23**: 665. 1923, in part; Jepson, Man. Fl. Pl. Calif., p. 607. 1925, in part; Munz, Man. S. Calif. Bot., p. 292. 1935, in part; Jepson, Fl. Calif. **2**: 444. 1936, in part.

Small evergreen trees with broad tops, glabrous throughout; innocuous. Leaves alternate, simple, more or less persistent, coriaceous, glabrous, margins more or less whitened, entire and subrevolute; petioles long. Flowers polygamo-dioecious, in dense terminal thyrsi. Sepals 5, persistent. Petals 5, deciduous. Ovary with 1 fertile cell, sessile on the disk; styles 3, more or less distinct, terminal. Drupes whitish, small, almost symmetrical, somewhat flattened; the sterile carpels forming a dull, raised line down one side of the fruit; epicarp glabrous, shining; mesocarp thick, waxy.

California and Lower California.

Type species: **Malosma laurina** (Nutt.) Nutt. ex Engler in DC., Monogr. Phaner. **4**: 393. 1883 *(Rhus laurina* Nutt. ex. Torr. & Gray, Fl. N. Am. **1**: 219. 1838).

Malosma is in some ways similar to *Toxicodendron* and in some ways to STYPHONIA. It is like STYPHONIA in its simple, coriaceous, evergreen leaves, and in being innocuous. It is like *Toxicodendron* in its whitish, glabrous, ceriferous drupes. It differs from both, however, in having the two abortive carpels of the ovary forming a raised line down one side of the fruit, and in having a dense terminal thyrsus. There is a single species.

1. **Malosma laurina** (Nutt.) Nutt. ex Engl. in DC., Monogr. Phaner. **4**: 393. 1883, in syn. Pl. 25, fig. 1.

Rhus laurina Nutt. ex Torr. & Gray, Fl. N. Am. **1**: 219. 1838.

Lithraea laurina Walp., Rep. Bot. Syst. **1**: 551. 1842.

Toxicodendron laurinum Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891.

Large, rounded, evergreen shrubs or trees, 2–4 m. tall, with aromatic odor; branches slender, glabrous, glaucescent, brown below, red at apex; leaves scattered, alternate, ovate or elliptical, rarely lanceolate or oblong, 4–9 cm. long, 2–4 cm. broad, coriaceous, smooth, reddish above, paler, greenish, and glaucescent beneath, simple, entire and subrevolute-margined, retuse or obtuse, emarginate or mucronate, somewhat folded along the midrib, obtuse or truncate at base; petioles 1–4 cm. long; flowers polygamo-dioecious, in a dense, terminal, intricately branched thyrsus 4–10 cm. long; bracts spatulate; sepals 5, ovate-deltoid, strongly imbricated, glabrous, persistent; petals 5, white, spreading, elliptical, glabrous; stamens with thickened filaments as long as the lanceolate-ovate anthers; pistil with three short, thickened, separate styles, ovary

1-celled; drupe about 1.5 mm. in diameter, glabrous, whitish, with a raised, often darkened line down one side, otherwise almost symmetrical.

Distribution: southern California and northern Lower California (fig. 26).
UNITED STATES:

CALIFORNIA: southern California, 1876, *Parry & Lemmon 43* (F, M); Little Santa Anita Canyon, July 2, 1902, *Abrams 2639* (F, M); Santa Monica Forestry Station, July 31, 1897, *Barber* (M); Los Angeles, July 23, 1910, *Blake 439* (F); Sierra Madre, Sept. 8, 1935, *Carter 955* (M); Santa Monica Mts., alt. 300 m., June 1929, *Clokey & Templeton 4588* (M); Claremont, June 10, 1915, *Davis* (M); Santa Monica Mts., Sept. 16, 1880, *Engelmann* (M); Altadena, May 1902, *Grant 1117* (F); Topango Canyon, Santa Monica Mts., June 3, 1916, *Hiatt* (M); San Fernando plains, June 1887, *Parish 1928* (F, M, ND); Santa Monica Canyon, Santa Monica, alt. 200 ft., March 15, 1912, *Smith 4458* (F); San Demas Canyon, San Gabriel Mts., alt. 2150 ft., Nov. 29, 1933, *Wheeler 2277* (ND); SANTA CATALINA ISLANDS:—May 1889, *Brandegee* (F); July 23, 1915, *Drushel* (M); Dec. 1900, *Eby* (M); Pebble Beach near fork of road, July 14, 1921, *Knopf 164*, and Camp Banning Canyon, Nov. 6, 1921, *502* (F); Avalon Valley, June 6, 1920, *Nuttall 309*, and May 15, 1930, *1157* (F); Aug. 17, 1915, *Rusby 401* (F); Avalon Canyon, May 24, 1912, *Smith 5164*, and May 26, 1912, *4988* (F); Avalon, May 1896, *Trask* (M);—Santa Ana Canyon, March 9, 1929, *Blankinship* (M); Santa Maria, July 1894, *Anderson* (ND), San Diego Co., July 13 and Aug. 1, 1902, *Brandegee 1643* (F, M), and San Diego, July 1906 (F); Point Loma, near San Diego, Nov. 6, 1880, *Engelmann* (M); La Jolla, Nov. 28, 1919, *Millspaugh 4460* (F); San Diego, 1875,

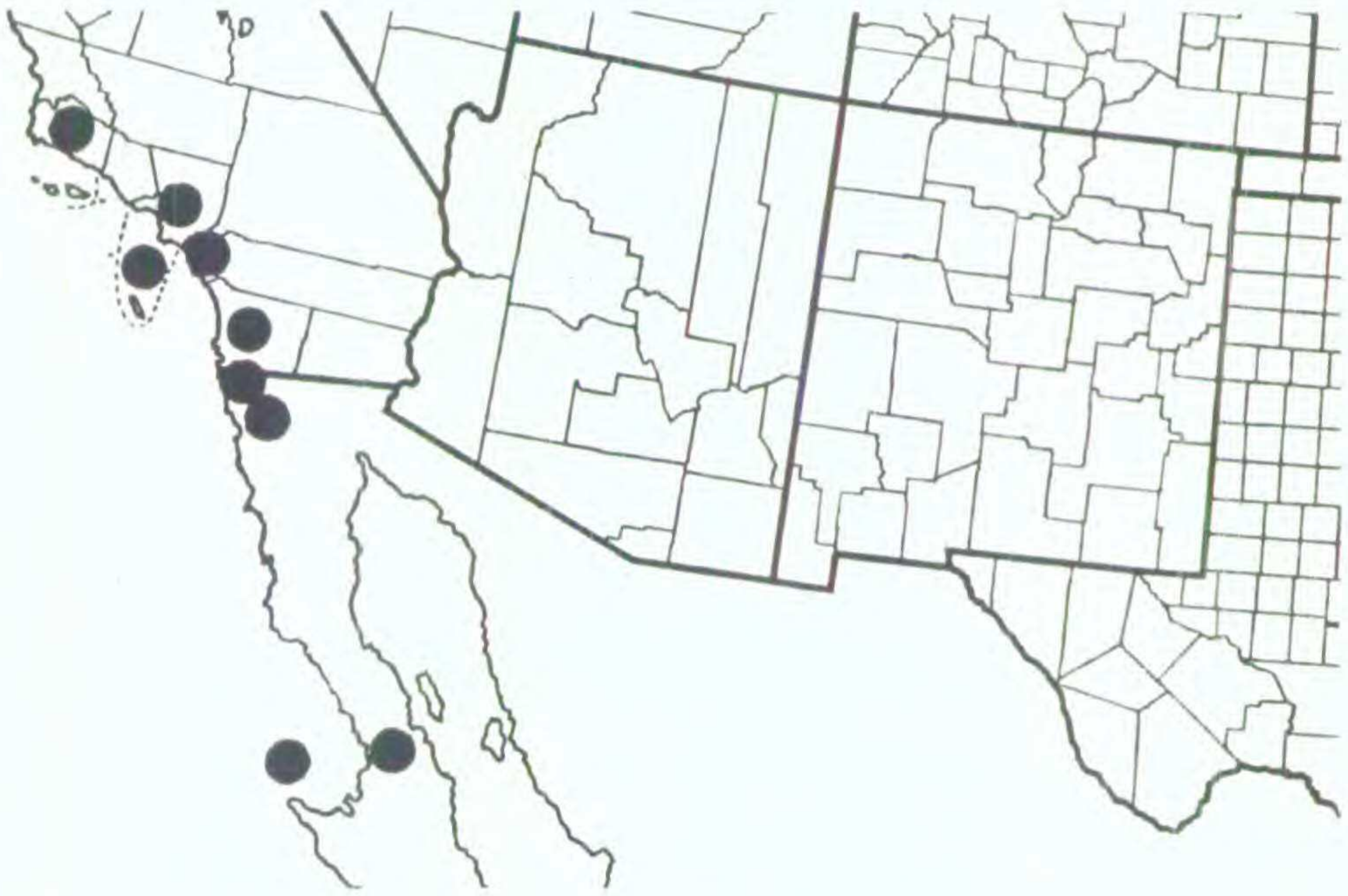

Fig. 26. The geographic distribution of *Malosma laurina* (Nutt.) Nutt. ex Engler.

Palmer 48 (F, M); Coast Range, Rainbow Post Office, June 17, 1897, *Parish 4462* (M), Fall Brook, Nov. 6, 1891 (F); Pueblo Lands, La Jolla, July 29, 1912, *Smith 5227* (F, M); San Diego, July 24, 1895, *Snyder* (F); Santa Barbara, Aug. 21, 1904, *Abrams 4154* (F, M); Mission Canyon, near Santa Barbara, May 16, 1908, *Eastwood 130,* and Sept. 12, 1908, *204* (F, M); Santa Barbara, Aug. 1902, *Elmer 4015* (F, M); Santa Barbara Co., 1865, *Torrey 75* (M).

MEXICO:

LOWER CALIFORNIA: Sierra de San Francisquito, Oct. 18, 1890, *Brandegee 112,* El Rancho Viejo, April 30, 1889, and San José de Gracia, April 8, 1889, and San Enrique, April 1889 (Calif); San Carlos River, Sept. 10, 1923, *Eastwood 12416* (CA); Todos Santos, July 5, 1882, *Fish* (F); Rosalia Bay, *(Orcutt) 122* (M), and Tiajuana, June 30, 1884 (F); Cape Colnett, May 27, 1889, *Pond* (ND); on San Pedro Martir, Aug. 1, 1903, *Robertson 46* (Calif); Ensenada, 1912, *Smith 5319* (F, M); San Antonio Canyon, Sept. 8, 1930, *Wiggins & Demaree 4760* (CA, F, ND); 2 miles north of Rosarito Beach, Sept. 7, 1929, *Wiggins & Gillespie 3874* (F, M); CEDROS ISLAND:—March–June, 1896, *Anthony* (Calif), Aug. 7, 1896, *28* (Calif, F, M), July–Oct. 1896, *122* (F); June 3, 1925, *Mason 1981* (CA, F); Dec. 7, 1888, *Pond* (ND);—GUADALUPE ISLAND:—June 1906, *Brown* (Calif), winter of 1892–1893, *Franceschi 9* (F, M); coll. of 1898, *Drent* (Calif).

TOXICODENDRON [Tourn.] Miller

Toxicodendron Tourn., Inst. Rei Herb., p. 610. 1700; Mill., Gard. Dict., ed. 8. 1768, excl. *T. Crenatum, T. Arboreo* & *T. Arborescens;* Medic., Phil. Bot. **1**: 156. 1789; Moench, Meth., p. 73. 1794, as *Toxicodendrum;* Kuntze, Rev. Gen. Pl., pt. 1, p. 153. 1891, in part; Greene, Leafl. Bot. Obs. & Crit. **1**: 115. 1905; Abrams, Bull. N. Y. Bot. Gard. **6**: 401. 1910; Britton, N. Am. Trees, p. 401. 1908; Small, Fl. Miami, p. 112. 1913; Britt & Brown, Illustr. Fl., ed. 2. **2**: 483. 1913; Woot. & Standl., Contr. U. S. Nat. Herb. [Fl. N. Mex.] **19**: 408. 1915; Abrams, Fl. Los Angeles, p. 219. 1917; Rydb., Fl. Rocky Mts. & Adj. Plains, p. 551. 1917; Key Rocky Mt. Fl., p. 153. 1919; Fl. Rocky Mts. & Adj. Plains, ed. 2, p. 551. 1922; Tidestr., Contr. U. S. Nat. Herb. [Fl. Utah & Nev.] **25**: 347. 1925; Schaffn., Manual Ohio, p. 348. 1928; Rydb., Fl. Prair. & Plains, p. 527. 1932; Small, Manual Southeast. Fl., p. 809. 1933; Stem. & Myers, Okla. Fl., p. 297. 1937.

Philostemon Raf., Fl. Ludovic., p. 107. 1817; Steud., Nom. Bot., ed. 2. **2**: 320. 1841, as *Philostemum.*

Pocophorum Necker, Elem. Bot. **2**: 226. 1790.

Rhus L., Sp. Pl. **1**: 265. 1753, in part, as to species 4, 6 & 7;

Gen. Pl., ed. 5. p. 129. 1754, in part as to *Toxicodendron* Tourn. in syn.; Willd., Sp. Pl. **1**: 1477. 1798, in part; DC., Cat. Pl. Hort. Bot. Monsp., p. 55. 1813, in part; Prodr. **2**: 67. 1825, sect. SUMAC in part; Hooker, Fl. Bor.-Am. **1**: 126. 1830, sect. SUMAC in part; G. Don, Gen. Hist. Dichl. Pl. **2**: 70. 1832, sect. SUMACH in part; Endl., Gen. Pl., p. 1131. 1840, sect. SUMAC in part; Ench. Bot., p. 599. 1841, sect. SUMAC in part; Walp., Rep. Bot. Syst. **1**: 551. 1842, in part; Gray, Manual, p. 78. 1846, sect. SUMAC in part; Gen. Pl. U. S. **2**: 157. 1846, in part; Manual, ed. 2, p. 76. 1856, sect. TOXICODENDRON; Koch, Dendrologie **1**: 574, 580. 1869, sect. SUMACH in part and sect. TOXICODENDRON; Engler, Bot. Jahrb. **1**: 379. 1881, sect. VENENATAE; Engler in DC., Monogr. Phaner. **4**: 376. 1883, sect. VENENATAE excl. *R. laurina;* Dippel, Handb. Laubholzk. **2**: 366. 1892, in part; Engler in Engl. & Prantl, Nat. Pflanzenfam. **3**^{5}: 168. 1892, sect. VENENATAE; Sargent, Sylva **3**: 13. 1892, in part; Koehne, Deutsche Dendrol. **1**: 360. 1893, sect. TOXICODENDRON; Britt. & Brown, Illustr. Fl. **2**: 385. 1897, in part; Gray, Syn. Fl. N. Am. **1**: 382. 1897, sect. RHUS in part as to *Toxicodendron;* Britton, Manual, p. 600. 1901, in part; Piper, Contr. U. S. Nat. Herb. [Fl. Wash.] **11**: 383. 1906, in part; Schneid., Illustr. Handb. Laubholzk. **2**: 149. 1907, subgenus TOXICODENDRON; Robinson & Fernald, Gray's New Manual, p. 552. 1908, sect. VENENATAE; Coult. & Nels., New Man. Bot. Cent. Rocky Mts., p. 312. 1909, in part; Sarg., Manual, ed. 2, p. 660. 1922, in part; Standl., Contr. U. S. Nat. Herb. [Trees & Shrubs Mex.] **23**: 665. 1923, in part; Jepson, Man. Fl. Pl. Calif., p. 607. 1925, in part; Rehder, Man. Cult. Trees & Shrubs, p. 538. 1927, in part; Munz, Man. S. Calif. Bot., p. 292. 1935, in part; Jepson, Fl. Calif. **2**: 448. 1936, in part.

Rhus-Toxicodendron Marsh., Arbust. Am., p. 130. 1785.

Vernix Adanson, Fam. Pl. **2**: 342. 1763.

Deciduous trees, shrubs, or woody vines with poisonous effluvium. Leaves alternate, ternate or imparipinnate, thin, glabrous or sparingly pubescent. Flowers usually polygamodioecious in pendent, axillary, lateral panicles. Bracts of the inflorescence lanceolate, deciduous. Sepals 5, persistent. Petals 5, ascending. Ovary 1-celled, sessile on the disk; style terminal, three-parted. Drupes large, whitish, about as broad as long, slightly compressed, glabrous or sparingly pubescent with simple hairs; mesocarp rich in wax and copiously "fibrous"; epicarp at length falling away from the mesocarp.

North and South America and Asia.

Type species: **Toxicodendron radicans** (L.) Kuntze, Rev. Gen. Pl., pt. 1, p. 153. 1891 *(Rhus Toxicodendron* L. Sp. Pl. **1**: 266. 1753).

The generic recognition of *Toxicodendron* as distinct from *Rhus* has long been a matter of controversy, and one which in the nature of such things can never be answered in an absolute manner. The non-glandular pubescence when present on the fruit-coat, the ceriferous mesocarp, the consistently poisonous effluvium, and the paniculate inflorescence in *Toxicodendron,* as contrasted with the glandular pubescence always present on the fruit-coat, the non-waxy mesocarp, the constantly innocuous effluvium, and the thyrsoidal inflorescence of *Rhus,* as well as many minor characters consistently different between these elements, are characters that seem to the author sufficiently well marked to separate the two as distinct genera.

KEY TO THE SECTIONS

Leaflets 3; small shrubs or vines	*Eutoxicodendron*
Leaflets 5–17; large shrubs or trees	*Vernix*

Section EUTOXICODENDRON Schneid., Illustr. Handb. Laubholzk. **2**: 149. 1907.

Toxicodendron Koch, Dendrologie **1**: 580. 1869, as section.

Deciduous woody vines or small shrubs, with comparatively slender branches. Flowers usually polygamo-dioecious in small, pendent, lateral, axillary panicles. Leaves alternate, thin, trifoliolate.

North America from Canada to southern Mexico, and in Japan and China.

EUTOXICODENDRON is predominantly a North American group, being represented in Asia by a single species. The species are usually quite variable, especially as regards fruit size, leaf margin, and habit.

KEY TO THE SPECIES AND VARIETIES

Seeds comparatively smooth; fruit usually distinctly papillose or pubescent; leaflets coarsely and irregularly lobate-denate..............*1. T. quercifolia*
Seeds mostly roughened; fruit mostly not pubescent; leaflets mostly entire but occasionally deeply and somewhat acutely lobate-denate, serrate-dentate, or crenate-dentate.
  Leaflets mostly obtuse or rounded at the apex, entire, crenate or bluntly lobed; Pacific Coast species...........................*2. T. diversiloba*
  Leaflets acute or acuminate, sometimes abruptly acute, entire, serrate or deeply lobed; generally distributed in North America.
    Leaflets entire or irregularly few-toothed, mostly not deeply toothed or lobed.
      Fruit mostly glabrous.
        Seeds not constricted at the side..........................*3. T. radicans*
        Seeds constricted at the side..............*3a. T. radicans* var. *divaricata*
      Fruit densely pilose with simple hairs........*3b. T. radicans* var. *littoralis*
    Leaflets regularly deeply serrate-toothed or lobed.
      Leaflets regularly and coarsely serrate-toothed or lobed, not tending to be trilobate..........................*3c. T. radicans* var. *verrucosa*
      Leaflets deeply lobed, the terminal tending to be deeply trilobate...... ....*3d. T. radicans* var. *eximia*

1. Toxicodendron quercifolia (Michx.) Greene, Leafl. Bot. Obs. & Crit. **1**: 127. 1905; "Michx." ex Dippel ex Durant & Jackson, Index Kew., suppl. 1, p. 433. 1901–1906. Pl. 26, fig. 1.

Toxicodendron Pubescens Mill., Gard. Dict., ed. 8. 1768, in part.

T. compactum Greene, Leafl. Bot. Obs. & Crit. **1**: 126. 1905.

T. monticola Greene, *ibid.* 126.

T. Toxicodendron Britt. in Britt. & Brown, Illustr. Fl., ed. 2. **2**: 484. 1913.

Rhus Toxicodendron L., Sp. Pl. **1**: 266. 1753, in part.

R. Toxicodendron var. *quercifolium* Michx., Fl. Bor.-Am. **1**: 183. 1803; Engler in DC., Monogr. Phaner. **4**: 395. 1883, in part; Dippel, Handb. Laubholzk. **2**: 376. 1892.

R. quercifolia Steud., Nom. Bot., ed. 1. p. 689. 1821.

R. pubescens Engelm. ex Engler in DC., Monogr. Phaner. **4**: 394. 1883, in syn.

Small shrubs, with slender, pubescent branches; leaflets three, at first densely pubescent above and below, later glabrate especially above, ovate, regularly lobate-dentate with 3–7 rounded, blunt or rarely subacute lobes, apex rounded, subacute or rarely subacuminate, base obtuse or subcuneate, terminal leaflet 5–9 cm. long, 4–7 cm. broad, petiolule about 2 cm. long, lateral leaflets somewhat smaller, inequilateral and often subentire on the upper margin and 3–7-lobed on the lower margin, petiolules about 5 mm. long; inflorescences lateral panicles, bracts lanceolate-deltoid, 0.6 mm. long, 0.3 mm. broad, glabrate, ciliate, deciduous; sepals deltoid-ovate, 1 mm. long, 0.5 mm. broad, glabrate; petals oblanceolate, glabrous, 3 mm. long, 1 mm. broad; anthers lanceolate, 1.3 mm. long, 0.9 mm. broad, filaments 1 mm. long; fruit cream-colored, mostly pubescent; seed about 3 mm. long, 4 mm. broad, 2.5 mm. thick.

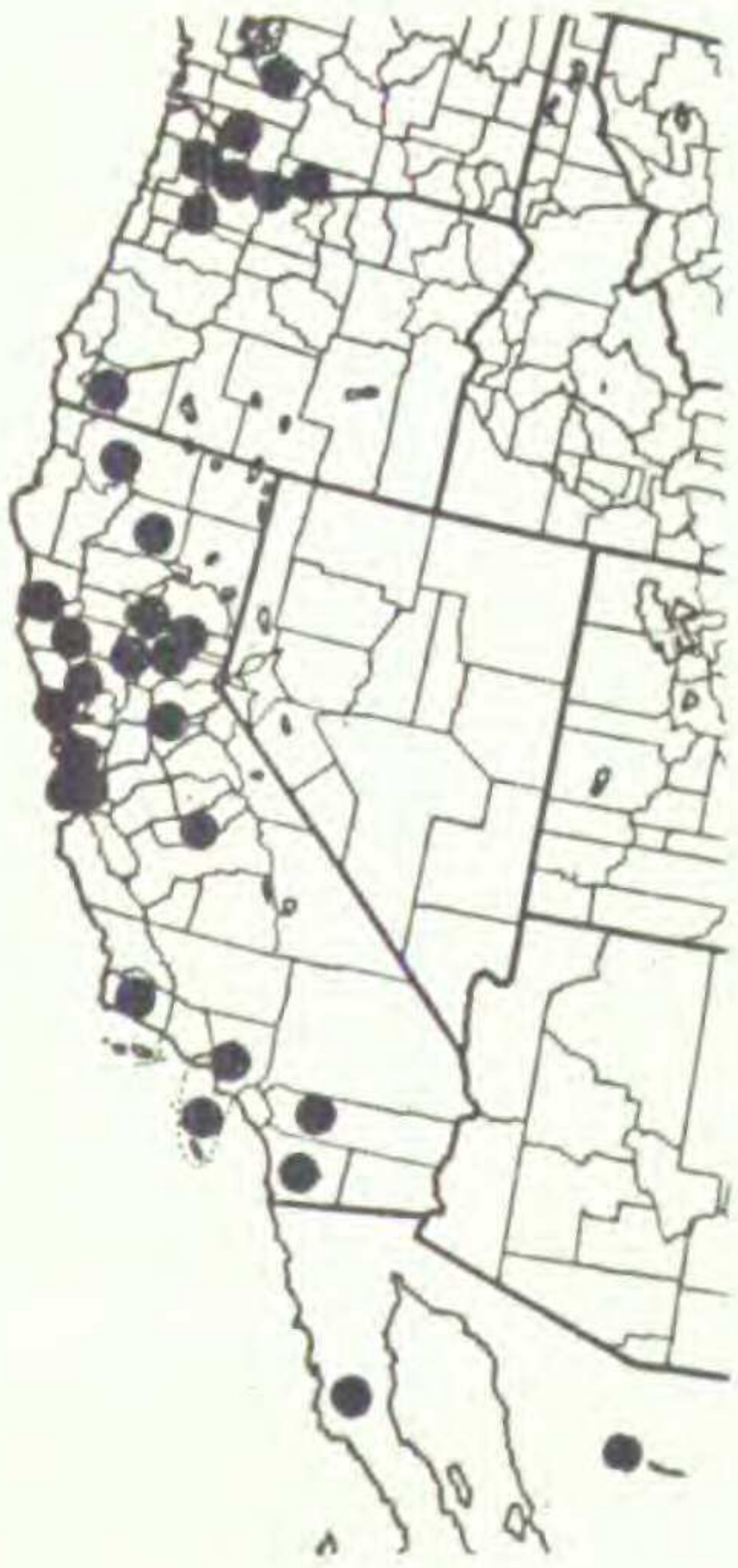

Fig. 27. The geographic distribution of *Toxicodendron diversiloba* (Torr. & Gray) Greene.

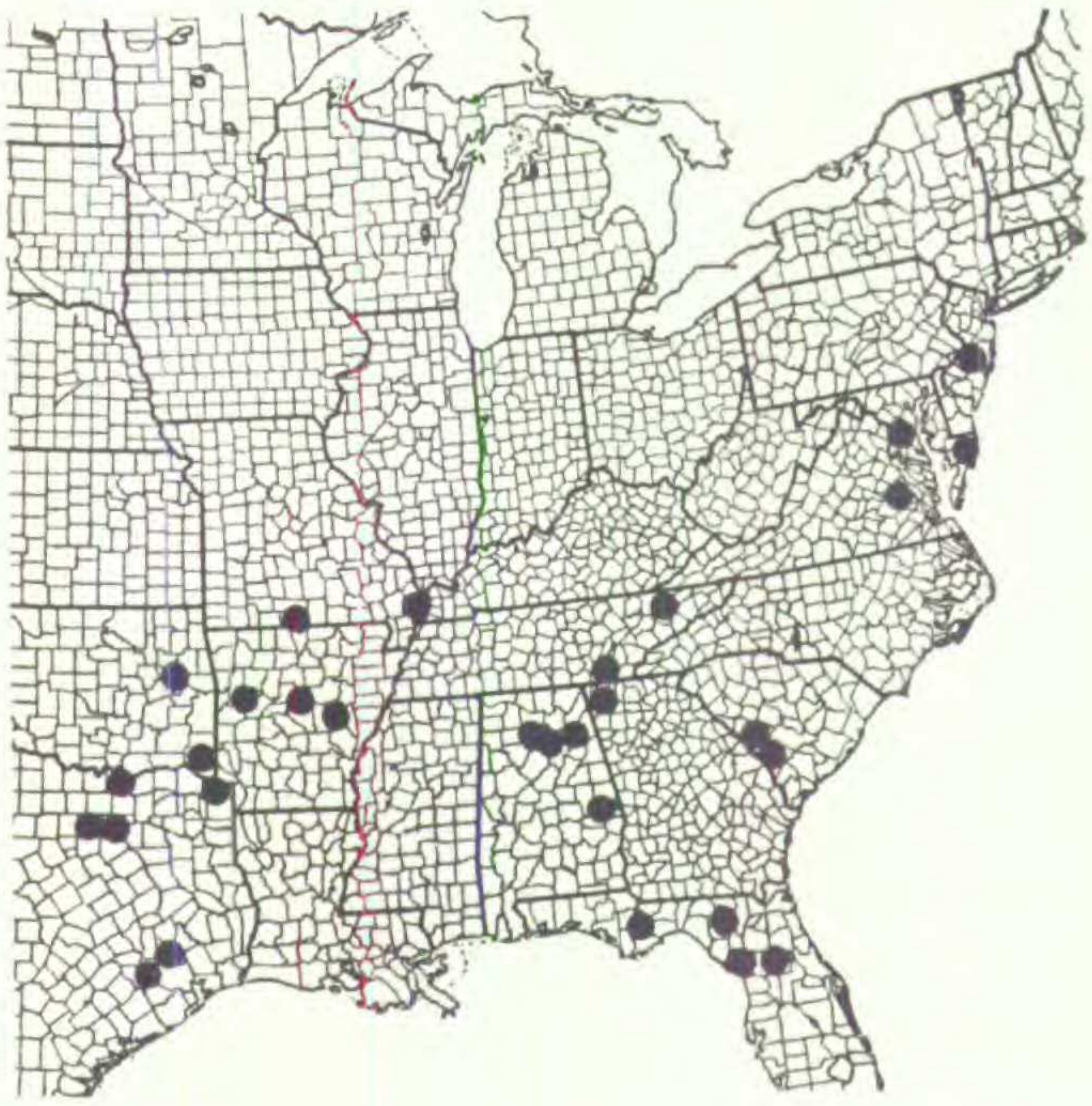

Fig. 28. The geographic distribution of *Toxicodendron quercifolia* (Michx.) Greene.

For this section of the genus, this is a species of remarkable uniformity as regards variation in leaf outline, pubescence, fruit character, and habit. There is little evidence of hybridization between this species and *Toxicodendron radicans* unless it be with the varieties in Texas and Oklahoma.

Distribution: New Jersey to Florida, west to Oklahoma and Texas (fig. 28).

UNITED STATES:

NEW JERSEY: *ex Bernhardi Herb.* (M).

MARYLAND: Snow Hill, Sept. 13, 1902, *Norton* (M).

DISTRICT OF COLUMBIA: Georgetown, May 28, 1859, *Schott* (F); near Terra Cotta, May 10, 1911, *Holm* (M).

VIRGINIA: Richmond, May 13, 1894, *Churchill* (M).

SOUTH CAROLINA: Graniteville, May 21, 1899, *Eggert*, and near King, May 24, 1899 (M); near Williston, April 15, 1932, *Palmer 39870* (M).

GEORGIA: near the line between Tennessee and Georgia, Lookout Mountain, May 6, 1906, *Churchill* (M); Lookout Mountain, July 1898, *Ruth 356* (US type of *T. monticola*, M photo.), *386* (ND).

FLORIDA: Levy Co., June & July 1898, *Hitchcock* (F); Aspalaga, April 1898, *ex Chapman Herb.* (M); near Ocala, April 5, 1929, *Palmer 35178* (M); Suwanee Co., June and July 1898, *Hitchcock* (F, M).

ALABAMA: Blount Co., June 20, 1897, *Eggert* (M); St. Bernard, May 20, 1919, *Wolf 78* (ND); Etowah Co., June 30, 1897, *Eggert* (M); Auburn, April 17, 1897, *Earle & Baker* (M), and 1898, *517* (F).

LOUISIANA: Chopin, April 21, 1915, *Palmer 7326*, and Chestnut, April 17, 1916, *9472* (M).

TENNESSEE: near Rutledge, Sept. 30, 1906, *Norton* (ND); Lookout Mountain, June 28, 1897, *Eggert* (M); Lookout Mountain, near Chattanooga, May 17, 1911, *Churchill*, and May 18, 1911 (M).

MISSOURI: 1 mile west of Charleston, July 12, 1933, *Palmer & Steyermark 41516* (M); near Tecumseh, Oct. 9, 1927, *Palmer 33025*, "Bald Jesse," near Gainesville, Oct. 10, 1927, *Palmer 33068* (M), and June 26, 1928, *34728* (F, M).

ARKANSAS: Cove Creek, Faulkner Co., 1925, *Demaree 70* (M); Fulton, May 21, 1909, *Bush* (M); West Mountain, Logan Co., April 24, 1924, *Palmer 24520*, and near Hazen, May 22, 1924, *25052* (M); near Hazen, May 22, 1924, *Wheeler 78*, and *85* (F).

OKLAHOMA: McCurtain Co., June 16, 1930, *Little & Olmsted 229* (Okla); Muskogee Co., June 19, 1927, *Little 1744* (Okla); 1 mile southwest of Tecumseh, July 21, 1937, *Barkley & Osborn 1405* (ND).

TEXAS: *ex Herb. Berlandierianum Texano-Mexicanum 625* (M); Bexar Co., April 8, 1935, *Parks B59, B60, B61* (M); Bowie Co., June 13, 1898, *Eggert* (M); Dallas, May 1876, *Reverchon*, and Denison, April 22, 1904 (M); near Conroe, April 15, 1928, *Palmer 33331* (M); Tarrant Co., June 20, 1928, *Ruth 550* (F); Huntsville, May 26, 1917, *Palmer 12049* (M); Hempstead, June 8, 1872, *Hall 78* (F).

2. Toxicodendron diversiloba (Torr. & Gray) Greene, Leafl. Bot. Obs. & Crit. **1**: 119. 1905.

Toxicodendron comarophyllum Greene, *ibid.* 120.

T. coriaceum Greene, *ibid.* 120.

T. dryophilum Greene, *ibid.* 121.
T. isophyllum Greene, *ibid.* 121.
T. lobadioides Greene, *ibid.* 119.
T. oxycarpum Greene, *ibid.* 121.
T. vaccarum Greene, *ibid.* 122; McNair, Field Mus. Bot. Ser. **4**: 59. 1925, as *T. vacicarum,* in syn.
Rhus lobata Hook., Fl. Bor.-Am. **1**: 127. 1830, non Poir., Encyc. Meth. Suppl. **5**: 264. 1804.
R. diversiloba Torr. & Gray, Fl. N. Am. **1**: 218. 1838.
R. diversiloba forma *radicans* McNair, Field Mus. Bot. Ser. **4**: 61. 1925.
R. diversiloba forma *quinquifolia* McNair, Bull. Torr. Bot. Club **63**: 473. 1936.
R. varielobata Steud., Nom. Bot., ed. 2. **2**: 452. 1841.
R. diversifolia Torr. & Gray ex Engler in DC., Monogr. Phaner. **4**: 395. 1883, in syn.
R. Toxicodendron subsp. *diversiloba* Engler in DC., *ibid.*

Shrubs or vines, with slender puberulent branches; leaflets 3 or very rarely 5, ovate, entire, crenate-dentate, or bluntly lobed, glabrate on both surfaces, apex mostly obtuse or rounded, base rounded to subcuneate, terminal leaflet 2–6.5 cm. long, 1.5–4 cm. broad, with petiolules 5–15 mm. long, lateral leaflets mostly about equilateral, 2.5–6 cm. long, 1–5.5 cm. broad, short-petiolulate or sessile; inflorescences lateral panicles, bracts oblanceolate, 1 mm. long, 0.3 mm. broad, glabrate, ciliate, deciduous; sepals deltoid-ovate, 1 mm. long, 0.5 mm. broad, glabrate; petals oblanceolate, glabrous, 3 mm. long, 1 mm. broad; anthers lanceolate, 1.1 mm. long, 0.6 mm. broad, filaments 1 mm. long; fruit whitish, mostly glabrous; seed about 3.5 mm. long, 5 mm. broad, 2.5 mm. thick.

Characteristic of the section EUTOXICODENDRON, this species is extremely variable. In habit it may be either a vine or a shrub. In outline its leaflets are predominantly ovate or obovate and obtuse, but the margins vary from entire, crenate-dentate, to crenate-lobed.

Distribution: Washington south to Lower California and Michoacan (fig. 27).

UNITED STATES: Pacific Coast, June and July 1880, *Howell* (F).

WASHINGTON: near Kelso, July 19, 1930, *Palmer 37961* (M); Seattle, May 13, 1911, *Bardell* (M); Columbia River, Klickitat Co., May 6 and July 1885, *Suksdorf* (F, US type of *T. lobadioides*, M photo.).

OREGON: *ex Chickering Herb.* (M); Willamette Slough, June 1877, *Howell* (M); Willamette Hills, May 1892, *Mulford* (M); Hood River Co., May 15, 1924, *Henderson* (M); Hood River, Aug. 1898, *Savage, Cameron & Lenocker* (F, M); 10 miles south of Kerby, June 7, 1928, *Thompson 4653* (M); Cobata Hook, banks of the Willamette, Salem, 1871, *Hall 82* (F, M); Portland, May 1886, *Drake & Dickson*, and April 1890 (F); Portland, 1909, *Nieuwland 2321*, and 1910 (ND); Multnomah Co., May 24, 1903, *Sheldon 12087* (F); Bridal Veil, Aug. 12, 1910, *Smith 3117* (F); Scroggins Creek, Washington Co., June 7, 1928, *Thompson 4291* (M).

CALIFORNIA: Sierra Valley, 187?, *Lemmon 79* (F); Berkeley, July 4, 1880, *Engelmann*, Oct. 22, 1880, and Oct. 23, 1880 (M); near Berkeley, 1886, *Greene* (ND); Amador Co., 1891, *Hansen* (ND), and New York Falls, Agricultural Station, alt. 2000 ft., 1892, *53* (M); near Chico, 1883, *Austin* (ND), Little Chico Creek, April 1896, and *749* (M), Little Chico Cañon, May 1896 (ND type of *T. dryophilum*, M photo.); Table Mountain, 8 miles north of Oroville, June 6, 1913, *Heller 10787* (F, M), cañon of Big Chico Creek, March 19, 1914, *11211* (F, M, ND), and Stilson Cañon, Chico, April 13, 1916, *12321* (F, M); Mount Konocti, April 26, 1923, and June 13, 1924, *Blankinship* (M); Claremont, June 1912, *Burnell* (M); Claremont, April 15, 1916, *Cox* (M); near Los Angeles, May 1902, *Eby* (M); Mandeville Canyon, Santa Monica Mts., April 10, 1930, *Epling*, and Arroyo Seco, near Pasadena, May 1925 (M); Pasadena, May 2, 1882, *Jones 3206* (M); Rubio Canyon, Mount Lowe, March 12, 1912, *Smith 4396* (F, M), and Eagle Rock Valley, May 1, 1912, *4904* (F); Claremont, March 12, 1923, *Whited 885* (ND); SANTA CATALINA ISLAND:—March 31, 1889, *ex Fritchey Herb.* (M); Aug. 1, 1922, *Knopf 485* (F); Bannings Harbor, Jan. 15, 1920, *Millspaugh 4596*, Avalon Canyon, Feb. 18, 1920, *4716*, and March 8, 1920, *4734* (F type of *R. diversiloba* forma *radicans*); Swains Canyon, July 20, 1920, *Nuttall 622*, Pebble Beach Canyon, Sept. 7, 1920, *834* (F); Avalon Canyon, June 7, 1912, *Smith 5069* (F);—Madera Co., North Fork and vicinity, May 30–June 8, 1903, *Griffiths 4599* (M); Sausalito, Aug. 12, 1872, *Redfield 45* (M); near Mendociño, alt. 500 ft., May 1898, *Brown 780* (M); June 1898, *750* (F); Tassajara Hot Springs, June 1901, *Elmer 3178* (M); Monterey, July 8, 1880, *Engelmann* (M); Carmel Highlands, June 5, 1925, *Epling 8296* (M); Salinas Valley, July 1880, *Vasey 86* (F); near Calistoga, June 15, 1894, *Greene* (ND), Nevada Co., alt. 5000 ft. (ND); Placer Co., Aug.–Oct. 1892, *Carpenter* (ND); near San Jacinto, alt. 600 m., March 9, 1898, *Leiberg 3117* (US type of *T. isophyllum*, M photo.); Tighe's, near San Diego, 1875, *Palmer 45* (F), and July 6, 1875 (M, cotype of *T. comarophyllum*); Santa Barbara, May 1902, *Elmer 3940* (F, M); near Stanford University, Palo Alto, April 17, 1902, *Baker 547* (M, ND); Black Mountain, May 1903, *Elmer 4785* (M); foothills of Los Gatos, April 20, 1904, *Heller 7327* (F, M); Saratoga Springs, May 11, 1888, *Leeds* (F), Los Gatos, April 12, 1889, and near San José, April 23, 1891 (F); Stanford University, Palo Alto, April 5, 1906, *McMurphy 56* (M); Santa Cruz, 1884, *Ball* (US type of *T. oxycarpum*, M photo.); Cow Creek Mountains, May 23, 1894, *Baker & Nutting* (ND type of *T. vaccarum*, M photo., ND not cotype); Klamath River, 6 miles below Hornbrook, Aug. 6, 1922, *Abrams 9900* (M); Marysville Buttes, alt. 400 ft., April 18, 1917, *Ferris 651* (M).

MEXICO:

LOWER CALIFORNIA: Box Cañon, 36 km. north of Enseñada, Sept. 11, 1929, *Wiggins & Gillespie 3997* (F, M).

MICHOACAN: La Maria, Marelia, June 1909, *Arsène 10* (F).

SONORA: Ouirocoba, Rio Fuerte, June 15, 1936, *Gentry 2246* (F).

3. Toxicodendron radicans (L.) Kuntze, Rev. Gen. Pl., pt. 1, p. 153. 1891. Pl. 26, fig. 2.

Toxicodendron radicans var. *normale* Kuntze, *ibid.*, p. 154.
T. radicans var. *microcarpa* Farwell, Am. Midl. Nat. **12**: 125. 1930.
T. radicans var. *volubile* Farwell, *ibid.*
T. Glabrum Mill., Gard. Dict., ed. 8. 1768.
T. Pubescens Mill., *ibid.*, in part.
T. Serratum Mill., *ibid.*
T. Volubile Mill., *ibid.*
T. Vulgare Mill., *ibid.*
T. magnum Bertram ex Steud., Nom. Bot., ed. 2. **2**: 694. 1841.
T. triphyllum Mill. ex Kuntze, Rev. Gen. Pl., pt. 1, p. 153. 1891.
T. arizonicum Greene, Leafl. Bot. Obs. & Crit. **1**: 123. 1905.
T. Blodgettii Greene, *ibid.* 126.
T. goniocarpum Greene, *ibid.* 125.
T. hesperium Greene, *ibid.* 118.
T. laetevirens Greene, *ibid.* 123.
T. longipes Greene, *ibid.* 118.
T. macrocarpum Greene, *ibid.* 117.
T. Negundo Greene, *ibid.* 117.
T. phaseoloides Greene, *ibid.* 123.
T. pumilum Greene, *ibid.* 124.
T. punctatum Greene, *ibid.* 125.
T. Rydbergii Greene, *ibid.* 117.
T. rufescens Greene, *ibid.* **2**: 46. 1910.
T. desertorum Lunell, Am. Midl. Nat. **2**: 185. 1912.
T. fothergilloides Lunell, *ibid.* 186.
Philostemon radicans Raf., Fl. Ludovic., p. 107. 1817.
Rhus radicans L., Sp. Pl. **1**: 266. 1753.

R. radicans var. *microcarpa* DC., Prodr. **2**: 69. 1825.

R. radicans var. *volubilis* DC., *ibid.*

R. radicans var. *vulgaris* DC., *ibid.*

R. Toxicodendrum L., Sp. Pl. **1**: 266. 1753, in part; Torr. & Gray, Fl. N. Am. **1**: 218. 1838, as *R. Toxicodendron.*

R. Toxicodendron var. *microcarpon* Michx., Fl. Bor.-Am. **1**: 183. 1803.

R. Toxicodendron var. *vulgare* Michx., *ibid.*

R. Toxicodendron var. *vulgaris* forma *radicans* Engler in DC., Monogr. Phaner. **4**: 394. 1883.

R. Toxicodendron var. *vulgaris* forma *volubilis* Engler, *ibid.*

R. Toxicodendron var. *radicans* Dippel, Handb. Laubholzk. **2**: 376. 1892.

R. Toxicodendron var. *Rydbergii* Garrett, Spring Fl. Wasatch Reg., ed. 3, p. 69. 1917.

R. Toxicodendron forma *radicans* McNair, Field Mus. Bot. Ser. **4**: 68. 1925.

R. humilis Salisb., Prodr. 170. 1796, as *Rhus Humile.*

R. scandens Salisb., *ibid.*, as *R. Scandens.*

R. toxicarium Salisb., *ibid.*, as *R. Toxicarium.*

R. microcarpa Steud., Nom. Bot., ed. 1, p. 689. 1821.

R. bahamensis G. Don, Gen. Hist. Dichl. Pl. **2**: 72. 1832.

R. acutiloba Turcz., Bull. Soc. Nat. Moscou **36**: 612. 1863.

R. toxicodendra St. Lag., Ann. Soc. Bot. Lyon **7**: 133. 1880.

R. tridentatum Sessé & Moc., Pl. Nov. Hisp., p. 47. 1887, non Thunb. ex Linn. f., Suppl., p. 184. 1781, nec Sond. ex Harv. & Sond., Fl. Cap. **1**: 511. 1859, nec Willd. ex Engler in DC., Monogr. Phaner. **4**: 438. 1883.

R. Uillosum Sessé & Moc., Pl. Nov. Hisp., p. 47. 1887, non *R. villosa* Linn. f., Suppl., p. 183. 1781, nec Hochst. ex A. Rich., Tent. Fl. Abyss. **1**: 145. 1847, nec E. Mey. ex Engler in DC., Monogr. Phaner. **4**: 427. 1883, nec Engler, Bot. Jahrb. **24**: 501. 1898.

R. Blodgettii Kearney, Bull. Torr. Bot. Club **21**: 486. 1894.

R. pubescens Farwell, Ann. Rept. Comm. Parks Detroit **11**: 73. 1900.

R. Rydbergii Small ex Rydb., Mem. N. Y. Bot. Gard. **1**: 268. 1900.

R. floridana Mearns, Proc. Biol. Soc. Wash. **15**: 148. 1902.

Rhus-Toxicodendron radicans Marsh., Arbust. Am., p. 131. 1785.

R.-T. toxicodendrum Marsh., *ibid.*

Shrubs or vines, with slender, glabrate to densely puberulent branches; leaflets 3, or very rarely 5, ovate, entire or irregularly serrate or dentate, acute to acuminate at apex, rounded to subcuneate at base, glabrate above, glabrate or pubescent below, terminal leaflet 3–20 cm. long, 1.3–13 cm. broad, with petiolules 1–4.5 cm. long, lateral leaflets mostly inequilateral, 3–17 cm. long, 1.3–10 cm. broad, petiolules 1–5 mm. long; inflorescences lateral panicles, bracts deltoid, 0.9 mm. long, 0.6 mm. broad, glabrate, ciliate, deciduous; sepals deltoid-ovate, 1 mm. long, 0.8 mm. broad, glabrate; petals oblanceolate, glabrous, 3 mm. long, 1 mm. broad; anthers lanceolate, 1 mm. long, 0.6 mm. broad, filaments 1.5 mm. long; fruit whitish, mostly glabrous; seed about 3 mm. long, 4 mm. broad, 2 mm. thick.

This is a most inconstant species, exhibiting considerable variation in size of fruit, leaf outline, and size of inflorescence. The leaflets are characteristically ovate and acute, but the margins vary from entire, through serrate, to deeply dentate. These variations may occur on a single plant or the leaves of an entire plant may be very similar. Likewise the plants are either shrubs or vines, or a portion of a shrubby plant may rub against a support and then become scandent. In the western portion of the range the leaf is rather uniformly broadly ovate and serrate, and the plant is more uniformly a small shrub than in the eastern portion of the range. In the southern part of the range the leaflets tend to become narrowly ovate or even lanceolate. The general diversity of the species has been well summarized by McNair, *loc. cit.*, p. 68. It is probable that there is occasional hybridization between the species and the varieties.

Distribution: Nova Scotia to Florida, west to British Columbia and Arizona; Nuevo Leon and Sonora to Oaxaca; Bermuda and the Bahamas (fig. 29).

CANADA:

NOVA SCOTIA: near Godfrey Lake, Yarmouth Co., Aug. 12, 1921, *Fernald & Long 24097* (M).

QUEBEC: Longueil, June 1908, *Victorin* (ND).

ONTARIO: Stokes Bay, Bruce Peninsula, Aug. 29, 1934, *Krotkov 9192* (M).

SASKATCHEWAN: Moose Jaw, June 20, 1896, *Macoun 12442* (ND).

ALBERTA: Spring Coulee, near Rosedale, alt. 2200–2500 ft., Aug. 20, 1915, *Moodie 1215* (NY).

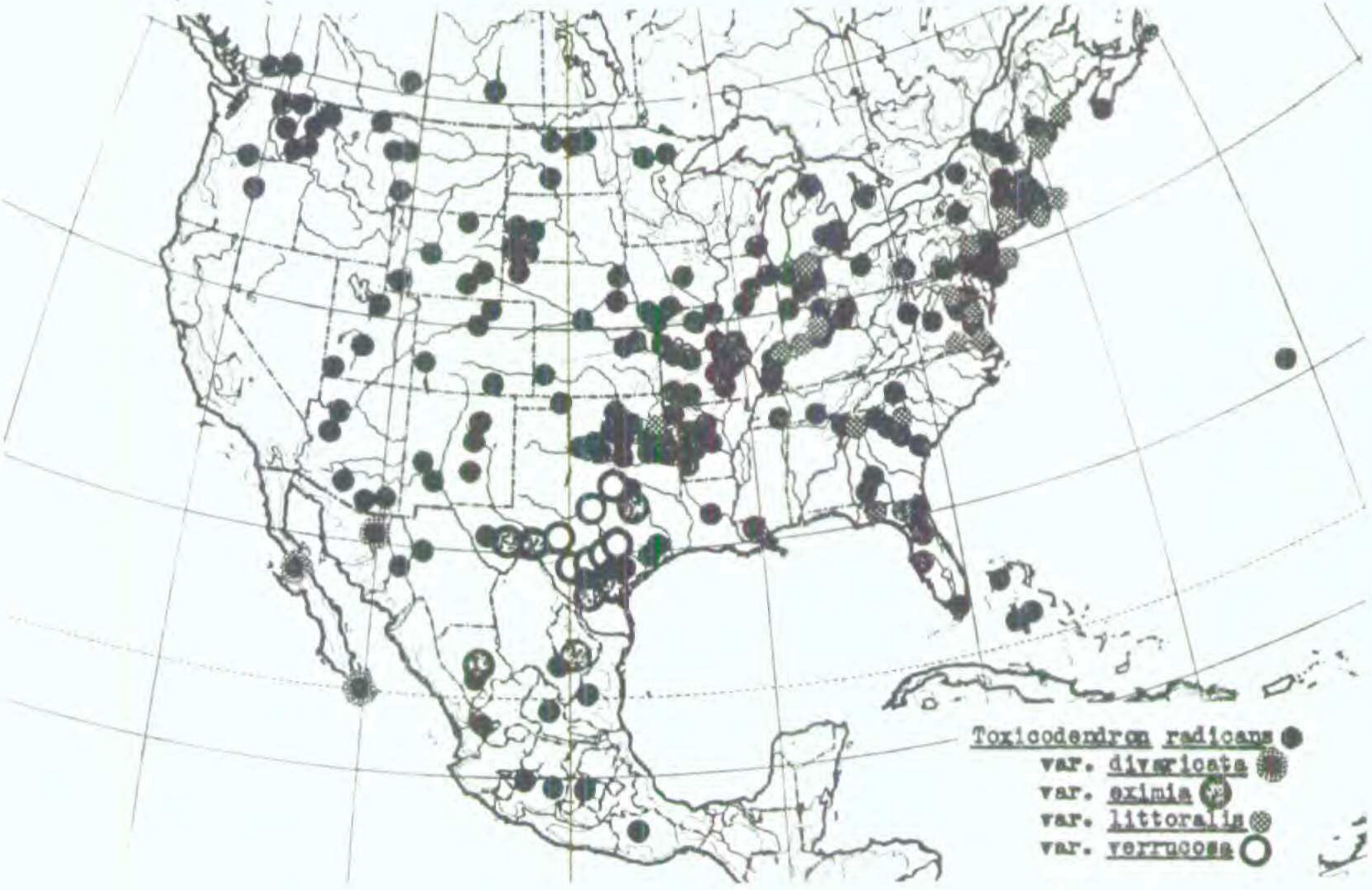

Fig. 29. The geographic distribution of *Toxicodendron radicans* (L.) Kuntze, and its varieties.

BRITISH COLUMBIA: Spence Bridge, May 25, 1889, *Macoun* (M); Hope, Victoria, Aug. 1910, *Newcombe 348* (F); Radium Hot Spring, June 30, 1927, *Sanson*, and Fairmont Hot Springs, June 31, 1927 (NY).

UNITED STATES: 1843, *Fremont's 2nd Exped.* (NY).

MAINE: Winthrop, 1862, *Sturtevant* (M); Bristol, July 28, 1898, *Chamberlain* (ND); White Island, off Boothbay, July 5, 1903, *Churchill* (M).

VERMONT: Barnet, June 20, 1884, *Blanchard,* and Aug. 20, 1886 (M); Willoughby Lake, June 5, 1895, *Churchill* (M); Quechee Gulf, July 4, 1910, *Britton* (NY).

MASSACHUSETTS: Hyannisport, July 4, 1896, *Churchill* (M), Hoosac Valley, Lanesboro, Aug. 17, 1915, and Aug. 19, 1916 (M); Salters Point, Dartmouth, July 9, 1923, *Knowlton* (M); Nonquitt, June 21, 1888, *Sturtevant,* also May 22, 1889, June 4, 1889, June 5, 1889, and June 21, 1889 (M); Nonamesset Island, Elizabeth Islands, June 23, 1928, *Fogg 3345* (M); Bradford, June 17, 1914, *Churchill* (M);

West Holyoke, June 22, 1925, *Seymour 490* (M); by Merrimac River, Lowell, June 14, 1927, *Beattie* (Okla); Lexington, May 30, 1896, *Churchill*, and Reservation, West Quincy, Sept. 2, 1895 (M); Norwell, June 26, 1910, *Knowlton* (M); Dorchester, July 16, 1882, *Churchill*, and Sept. 27, 1885 (M); Middletown, June 13, 1836, *Buckley* (M).

CONNECTICUT: Thompson, June 10, 1922, *Churchill & Lane* (M).

NEW YORK: Henderson, Aug. 1896, *Tidestrom* (NY); Fall Creek, Ithaca, June 19, 1878, *Trelease* (M); Lansing, Sept. 14, 1919, *Wiegand 12401* (M).

NEW JERSEY: north shore of Nescochaque Lake, Pleasant Mills, May 25, 1933, *Hermann 4207* (M); south shore of Crystal Lake on Main Branch of Newton Creek, Westmont, June 6, 1926, *Adams 236* (M); Somerset Co., *Perry* (M).

PENNSYLVANIA: Squaw Run near Pittsburgh, June 21, 1885, *Shafer* (ND); Mercersburg, June 1850, *Porter* (M); Mountville, Aug. 1896, *Eby* (M); near Philadelphia, June 10, 1873, *Redfield 1167* (M); Philadelphia, *Trig* (M).

MARYLAND: south of Annapolis, Aug. 18, 1913, *Tidestrom 6639* (M).

DISTRICT OF COLUMBIA: Dalecarlia Reservoir, May 23, 1905, *Painter 1291* (M); vicinity of Washington, Oct. 8, 1897, *Steele* (M).

VIRGINIA: near Luray, Aug. 29, 1901, *Steele 157* (M); immediate vicinity of Colonial Beach, Aug. 2–3, 1912, *Tidestrom & Bartlett 5971* (M).

NORTH CAROLINA: Tryon, May 18–20, 1899, *Churchill* (M).

SOUTH CAROLINA: near Graniteville, May 21, 1899, *Eggert* (M); Anderson: Baldwin woods, May 8, 1912, *Davis 8168*, and Whitner Park, July 7, 1921, *1710* (M); near Denmark, April 15, 1932, *Palmer 39863* (M); Clemson College, May 17, 1906, *House 2162* (M).

GEORGIA: between Gray and Macon, June 1, 1928, *Gillespie 4889*, and Dougherty Co., May 1, 1928, *4947* (ND); near the line between Tennessee and Georgia, Lookout Mountain, May 6, 1906, *Churchill* (M).

FLORIDA: Indian River, east Florida, 1874, *Palmer 96* (M); *Saurman* (M); Gainesville, May 1925, *O'Neill* (M); near Jacksonville, March 28, 1894, *Curtiss 4646* (M); Tampa Bay, May 12, 1893, *Rolfs* (M); Alva, July–Aug. 1900, *Hitchcock* (M, cotype of *R. floridana*); near Ocala, April 6, 1931, *Palmer 38400* (M); Pine Key, *Blodgett* (NY, probably type of *R. Blodgettii*, M photo.).

MISSISSIPPI: 1858, *Cyard* (M).

LOUISIANA: Natchitoches, April 23, 1915, *Palmer 7353* (M); New Orleans, April 16, 1846, *Fendler* (M); in the vicinity of Alexandria, May 22, 1899, *Ball 429* (M); north of Lake Maurepas, March 26, 1937, *Seibert 702, 703*, and *721* (M); near St. Martinsville, April 13, 1893, *Langlois* (ND).

OHIO: Oxford, June 20, 1910, *Overholts* (M); Cedar Point, Sandusky, July 17, 1906, *Jennings* (ND); John Bryan State Park, Yellow Springs, July 11, 1935, *Demaree 11455* (M).

WEST VIRGINIA: near Bucklin, June 1, 1895, *Pollock* (M).

MICHIGAN: Grand Beach, Sept. 3, 1917, *Nieuwland* (ND); south shore of Douglas Lake, July 16, 1912, *Harper* (NY); Agricultural College, East Lansing, June 9, 1896, *Skeels* (M); Ross, July 10, 1889, *Sones* (M); Rochester, Sept. 18, 1907, *Farwell 1492a* (Farwell); Ann Arbor, *Fritchey 26* (M); Belle Isle, Oct. 19, 1894, & spring 1895, *Farwell 1492* (Farwell type of *R. pubescens*).

INDIANA: northern Indiana, Aug. 20, 1917, *Nieuwland* (ND); Michigan City, June 18, 1911, *Deam 8854* (Deam), and Lake Maxinkuckee, Oct. 8, 1906 (ND);

Lake Maxinkuckee, Sept. 15, 1906, *Clark* (ND); Otwell, June 5, 1934, *Deam 55009*, and Chesterton, Aug. 22, 1915, *18007* (Deam); Notre Dame, June 6, 1911, *Nieuwland* (M), *2666*, *3269*, and Aug. 20, 1917 (ND); Crossplains, June 19, 1915, *Deam 16183*, and Wells Co., June 22, 1897 (Deam), and June 7, 1903 (M).

KENTUCKY: coll. of 1812, *Short* (M).

TENNESSEE: near Sherwood, June 7, 1897, *Eggert* (M); Bolivar, May 14, 1920, *Palmer 17499* (M).

WISCONSIN: Cobblestone Beach, Garrett Bay, June 14, 1933, *Fassett 16238* (M); near Ellison Bay, Sept. 14, 1925, *Palmer 28772* (M); Milwaukee, *Lapham* (M); Baraboo River, near Ableman, June 6, 1925, *Palmer 27657* (M).

ILLINOIS: Mississippi bottoms in Illinois, May 26, 1875, *Eggert* (ND); Stony Island, July 21, 1914, *Smith 6033* (M); Tunnel Hill, May 17, 1919, *Palmer 15168* (M); Illinois State Park, Starved Rock, June–Sept. 1921, *Thone 264* (M); Peoria, June 10, 1912, *Churchill* (M); Mounds, May 7, 1919, *Palmer 15072* (M); Red Bud, June 3, 1888, *Pammel* (M); near Cahokia, June 1, 1874, *Eggert* (M); opposite St. Louis, Aug. 1863, *Engelmann* (M); near Pittsburg, Aug. 29, 1891, *Douglass* (M).

MINNESOTA: Schoolcraft Island, July 30, 1929, *Grant 2976* (M); Ingersand, Sand Lake, Sept. 12, 1925, *Johnson 1891*, and Farley's, Aug. 7, 1926, *2122* (M).

IOWA: Decatur Co., June 12, 1901, *Anderson*, and June 15, 1901 (M); Ames, Sept. 1909, *Campbell 57*, and no date, *Hitchcock* (M).

MISSOURI: along Chariton River, near Novinger, June 16, 1924, *Palmer 25504* (M), near Watson, Sept. 3, 1920, *18912*, near Cole Camp, May 10, 1926, *30035*, Van Buren, July 6, 1914, *6207*, and Missouri River near Forest City, June 12, 1924, *25402* (M); woods, Sibley, June 28, 1907, *Bush 4805*, and Independence, May 31, 1921, *9365*, Swope Park, Kansas City, June 12, 1923, *10103*, Courtney, June 17, 1932, *12469*, *12469B*, *12470*, *12471*, *12472* (M), June 8, 1934 (M, ND), *13892* (M), and *13744* (ND); Webb City, May 10 1901, *Palmer 52*, Larussel, Oct. 2, 1908, *1517*, also Jasper, May 6,1909, *1903*, Webb City, June 4, 1909, *2135*, Prosperity, Sept. 17, 1913, *4351*, and Turkey Creek near Joplin, June 18, 1923, *23361* (M); Kimmswick, July 7, 1885, *Wislizenus 58* (M); near Columbus, June 21, 1930, *Palmer 36615* (M); Riverview Park, Hannibal, Aug. 25, 1923, *Davis* (M); North Fork of White River, near Tecumseh, Oct. 7, 1927, *Palmer 32912*, and near Pontiac, June 27, 1928, *34792* (M); Jerome, May 25, 1914, *Kellogg 310* (M); Bear Creek, Oct. 10, 1922, *Davis* (M); opposite Alton, St. Charles Co., Oct. 8, 1891, *Deng* (M); St. Louis Co., May 21, 1914, *Emig 287* (M); Carsonville, May 25, 1886, *ex Fritchey Herb. 228* (M); Allenton, *Letterman*, and July 10, 1884, 1894, June 1900, and May 20, 1912 (M); Old Orchard, Oct. 1886, *Pammel* (M); Kirkwood, July 18, 1926, *Woodson* (M); Montier, May 15, 1894, *Bush 144*, Swan, May 20, 1907, *4594* (M); Branson, Oct. 23, 1913, *Palmer 4714* (M).

ARKANSAS: Twin Mountain, Benton Co., Oct. 15, 1928, *Demaree 4579* (F, M); near Hot Springs, June 5, 1923, *Palmer 23098* (M); Fulton, April 30, 1905, *Bush 2508*, and April 28, 1914, *Palmer 5146* (M); base of Magazine Mountain, Logan Co., May 10, 1924, *Palmer 24810* (M); Caddo Creek Bottoms, Norman, Oct. 8, 1932, *Demaree 9563* (M); near Nogo, Sept. 23, 1932, *Merrill 52* (M); Arkansas River bottoms below Natural Steps, Oct. 12, 1931, *Demaree 8569* (M).

NORTH DAKOTA: Fort Totten, July 2, 1912, *Bergman 1895*, and May 28, 1912, *Holm* (M); Butte, June 16, 1907, *Lunell*, also Minnewauken, June 26, 1907 (NY), Pleasant Lake, Aug. 14, 1911, and June 11, 1912 (Deam), Sand Hills, July 13, 1899, *705* (Minn type of *T. desertorum*, M photo.); Wade, June 25, 1907, *Bell 104* (Okla); Devil's Lake, June 29, 1902, *Lunell 706* (Minn type of *T. fothergilloides*, M photo.), July 1, 1905, *706* (Minn, M photo.), and June 26, 1913 (M); near Devils Lake, July 4, 1930, *Palmer 36868* (M).

SOUTH DAKOTA: Warren's Woods, June 14, 1902, *Johnson* (M); Hermosa, alt. 3500 ft., June 26, 1892, *Rydberg 594* (NY); Deadwood, July 16, 1913, *Carr 83* (M, NY); near Piedmont, June 8, 1929, *Palmer 37020* (M); Black Hills, *Pratt 36* (NY); Bad Lands, near Wall, June 15, 1929, *Palmer 37264* (M, NY); Rockerville, Black Hills, June 1909, *White* (M); White River valley, Aug. 8, 1911, *Visher 2184* (NY).

NEBRASKA: Fort Clark, July 1853–1854, *Hayden* (M); Republican Valley, May 20, 1894, *Laybourne 47* (M); banks of Platte River opposite Columbus, June 5, 1929, *Palmer 36060* (M, NY); Newcastle, June 23, 1893, *Clements* (NY); Minden, Sept. 1913, *Hapeman* (M); Kearney Co., June 13, 1891, *Rydberg 41* (NY); Monroe Canyon, Sept. 4, 1901, *Baker* (M).

KANSAS: Syracuse, July 11, 1893, *Thompson 102* (M, NY, cotypes of *T. macrocarpum*); St. George, May 28, 1890, *Kellerman* (M); Manhattan, 1883, *Bassler* (ND); Riley Co., Aug. 6, 1892, *Norton* (ND), Sept. 28, 1895, *73* (M, cotype of *T. Negundo)*, and 1896, *73a* (M).

OKLAHOMA: near Knowles, May 19, 1913, *Stevens 516* (M); ten miles west of Norman, May 10, 1928, *Barkley* (Okla), by the Canadian River, 3 miles south of Norman, Aug. 14, 1934 (M); east of Lexington, May 10, 1930, *Gowan 74* (Okla); vicinity of Fort Sill, May 20, 1916, *Clemens 11676* (M); Cache Creek bank, July 14, 1934, *Pottz* (M); Sapulpa, July 22, 1894, *Bush 57* (M); six miles north of Reed, June 8, 1931, *Bull 158* (Okla); Tishomingo, Sept. 7, 1914, *Palmer 6412* (M); north of Red Oak, June 13, 1930, *Clark 2856* (Okla); near Boss, May 22, 1916, *Houghton 3718* (M); McCurtain Co., June 5, 1930, *Little & Olmstead 1550*, also Highway 21, N. Hairpin Bend, June 7, 1930, *113*, and July 13, 1930, *565* (Okla); Commerce, Aug. 3, 1923, *Bush 10142* (M); ten miles south of Stillwater, July 14, 1927, *Stratton 162* (M); Hartshorne, Aug. 9, 1930, *Clark* (Okla); Tecumseh, June 22, 1932, *Isaacson & Barkley* (Okla); Clayton, June 10, 1893, *Waugh 124* (M).

TEXAS: *Berlandier 2475* (M); Hortons, Aug. 6, *Reverchon* (M); Gamble's Ranch, June 5, 1918, *Palmer 13928* (M); Leon Springs, May 29, 1911, *Clemens 830* (M); Bexar Co., April 8, 1935, *Parks B50, B51, B52, B53, B54, B55, B56, B57, B58, B63, B64, B65, B66, B67, B68* (M); near Blanco, May 11, *Palmer 33893* (M); Columbia, April 14, 1899, *Bush 142* (M); Columbia, March 25, 1914, *Palmer 5024* (M); Comal Co., 1842, *Lindheimer*, Aug. 1846, *247*, also near New Braunfels, Sept. 1846, *246*, and 1847, *346* (M); West Dallas, June 23, 1899, *Eggert* (M); Dallas Co., May 1876, *Reverchon 188* (M); Gillespie Co., *ex Jermy Herb.* (M); near Houston, April 22, 1899, *Eggert* (M); Houston, April 1842, *Lindheimer* (M); Navidad River, Ganado, March 20, 1916, *Palmer 9233* (M); Little Aguja Canyon, Davis Mts., June 12, 1928, *Palmer 34521* (M, NY); near Lubbock, 1930, *Demaree 7629* (M); D'Hanis, Oct. 19, 1916, *Palmer 11089*, and San Angelo, Oct. 25, 1916, *11137* (M); Tom Green Co., 1879, *Tweedy* (NY); Leona River, near Uvalde, April 30, 1928, *Palmer 33638* (M).

MONTANA: Great Falls, Aug. 5, 1885, *Williams 291* (NY type of *R. Rydbergii*, M photo.); Bigfork, July 21, 1908, *Butler 3062* (NY); near Bozeman, alt. 5000 ft., Aug. 14, 1905, *Blankinship 106* (M); Helena, *Anderson* (NY); in the vicinity of Helena, June 3, 1891, *Kelsey* (NY); along the upper Madison River, Madison Co., June 17, 1937, *Lenz* (M, ND).

WYOMING: Freezeout Hills, July 11, 1898, *Nelson 4857* (M, NY); Pole Creek canyons, Albany Co., June 2, 1894, *Nelson 154* (ND); Wind River Range, Fremont Co., alt. 6000 ft., Aug. 20, 1905, *Johnson* (NY); Hartville, July 16, 1894, *Nelson 557* (ND); Big Horn, alt. 5000 ft., June 28, 1899, *Tweedy 2289* (NY); Evanston, alt. 6800–6900 ft., Aug. 2, 1902, *Pammel & Blackwood 3630* (M).

COLORADO: near Boulder, elev. 5000–6000 ft., July 1902, *Tweedy 4946* (NY); Fort Collins, alt. 5000 ft., June 23, 1893, *Crandall* (NY), and Dixon Canyon, Las Animas Co., June 25, 1897 (NY); Norwood Hill, San Miguel Co., Aug. 18, 1912, *Walker 498* (NY).

NEW MEXICO: 1847, *Fendler 98* (M); Capelin Canyon, Sandia Mts., alt. 8100 ft., June–July 1914, *Ellis 245* (M, NY); Santa Fe Canyon, Oct. 3, 1913, *Rose, Fitch & Parkhurst 17743* (NY); on or near the west fork of the Gila River, in the Mogollon Mts., alt. 7500 ft., Aug. 2, 1903, *Metcalfe 339* (M, ND, NY); Salado Canyon, July 27, 1900, *Earle 485* (M, NY); Mora Ocate Creek, June 22, 1846, *Wislizenus 502* (M); Winsor's Ranch, Pecos National Forest, alt. 8400 ft., June 29, 1908, *Standley 4011* (M, NY); Las Vegas, 6400 ft., June 5, 1902, *Tuttle* (NY); Kingston, alt. 6600 ft., July 9, 1904, *Metcalfe 1088* (M, NY, cotypes of *T. punctatum*).

ARIZONA: Chiricahua Mts., Chaperon Canyon above road crossing, Oct. 7, 1906, *Blumer 102*, and alt. 7500–8000 ft., July 1, 1907, *UR2* (ND), alt. 7500 ft., July 1, 1907, *1325* (M), Big Emigrant Canyon, alt. 4500 ft., Nov. 6, 1906, *102a* (ND); Huachuca Mts., June 29–July 5, 1903, *Griffiths 4846* (M); Fort Huachuca, April 26–May 21, 1890, *Palmer 453a* (US type of *T. arizonicum*); west fork, Oak Creek Canyon, south of Flagstaff, alt. 5200–5500 ft., June 13, 1927, *Goddard 569* (M); vicinity of Flagstaff, alt. 7000 ft., June 2, 1898, *MacDougal 28* (NY, US type of *T. pumilum*, M photo.); Gila Co., Aug. 17, 1935, *Little 4007* (ND); Fort Lowell, Oct. 1880, *Lemmon* (M); Santa Catalina Mts., May 5, 1894, *Toumey* (US type of *T. laetevirens*); Nogales, 1892, *ex Brandegee Herb.* (Calif); Nogales, 1908, *Rose 11943* (US); Rio Verde, Fort Whipple, Aug. 28, 1865, *Coues & Palmer 465* (M).

IDAHO: Bonner's Ferry, Aug. 30, 1926, *Epling 10465* (M); east side of Lake Pend d'Oreille, Hope, Aug. 25, 1892, *Sandberg, MacDougal & Heller 963* (NY).

UTAH: City Creek Canyon, near Salt Lake City, July 25, 1930, *Palmer 38033* (M); south of Glenwood, alt. 6300 ft., June 12, 1875, *Ward 212* (US type of *T. longipes*, M photo.); Springdale, alt. 4000 ft., May 14, 1894, *Jones 5249* (M).

WASHINGTON: coll. of 1889, *Vasey 212* (US); Wenatchee, Aug. 6, 1896, *Whited 241* (US type of *T. hesperium*, M photo.); Dry Falls, Coulee City, June 22, 1935, *Thompson 9115* (M, ND); Spokane Co., Sept. 9, 1902, *Kreager 538* (NY, US); Spokane, July 1898, *Savage, Cameron & Lenocker* (M); near International Boundary, between Kettle and Columbia Rivers, June 6, 1902, *Macoun 63750* (ND, NY); Waitsburg, May 31, 1897, *Horner 129* (US); Wawawai, May 1897, *Elmer 778* (M, NY, US).

OREGON: 1897, *Sheldon 8280* (US); Deschutes River, Creek Co., May 8, 1885, *Howell* (US); bank of Deschutes River, Redmond, Aug. 17, 1919 and July 4, 1920, *Whited 122* (ND); near Hood River, Oct. 1, 1923, *Henderson* (M).

MEXICO: Fortin, March 1883, *Kerber 397* (F); coll. of 1787–1804, *Sessé, Mociño, Castillo & Maldoñado 856, 930, 1382,* and *1445* (F, Madrid); Sierra del Pajarito, June 27–28, 1855, *Schott* (F).

Chihuahua: San Diego, alt. 6000 ft., March 28, 1891, *Hartman 589* (Calif, F); Cajon Creek, near United States boundary line, July 2, 1892, *Mearns 394* (M).

Durango: Durango, April–Nov. 1896, *Palmer 106,* in part (F).

Jalisco: Sierra de Nayarit, Territoire Huichol, *Diquet* (NY).

Mexico: Mount Ixtaccihuatl, alt. 7000–8000 ft., 1903, *Purpus 269* (Calif, M).

Michoacán: vicinity of Morelia: Rincón, April 11, 1909, *Arsène 3011,* also Loma Santa Maria, alt. 1950 m., April 18, 1909, *2509,* and June 14, 1909, *2763* (M), also San Augustin, Sept. 7, 1910 (F); near Uruapan, Jan. 22, 1926, *Woronow 2769* (F).

Nuevo Leon: Hacienda Pablillo, Galeana, Aug. 27, 1936, *Taylor* (F).

Oaxaca: June 22, 1909, *Conzatti 2409* (F).

San Luis Potosi: coll. of 1878, *Parry & Palmer 124* (M).

Sonora: Tunicachi, alt. 5600 ft., Dec. 7, 1890, *Hartman 102* (US type of *T. phaseoloides,* M photo.); El Alamo, near Magdalena, May 20, 1925, *Kennedy 7106* (CA, Calif).

Tamaulipas: vicinity of Victoria, Feb. 1–April 9, 1907, *Palmer 138,* and *165* (Calif, F, M), also *228* (F, M).

WEST INDIES:

Bermuda Islands: Paget Marsh, Bermuda, Aug. 31–Sept. 20, 1905, *Brown & Britton 214* (F, G, US).

Bahama Islands: Staniard Creek, Andros Island, Feb. 1–3, 1910, *Small & Carter 8850* (F, US); West End, Great Bahama Island, April 16–May 8, 1905, *Brace 2570* (F); Eight Mile Rocks, Great Bahama Island, Feb. 5–13, 1905, *Britton & Millspaugh 2446* (F, US); near Delaport, New Providence Island, Feb. 22, 1905, *Britton 2416* (F); North Cat Cay, April 15, 1904, *Millspaugh 2336* (F).

3a. **Toxicodendron radicans** (L.) Kuntze var. **divaricata** (Greene) Barkl., n. comb.

Toxicodendron divaricatum Greene, Leafl. Bot. Obs. & Crit. 1: 122. 1905.

Rhus divaricata McNair, Field Mus. Publ. Bot. **4**: 69. 1925, non Eckl. & Zeyh., Enum. Pl. Afr., p. 146. 1834.

R. Greenei McNair, *ibid.* [in addenda].

Vines with trifoliolate leaves; leaflets lanceolate to ovate, subacuminate to acuminate, entire or irregularly serrate, obscurely sparse-pubescent, usually subcuneate at base; fruit glabrous; seed constricted at the side.

MEXICO:

Lower California: Sierra de la Laguna, Jan. 23, 1890, and 1892, and Oct. 4, 1899, *Brandegee,* and Sierra San Lazaro, Sept. 1893, also La Chupanosa, Oct. 17, 1893 (Calif); Calmalli, Jan.–March 1898, *Purpus* (Calif, US **type**, M photo.).

Sonora: Agua Nueva Arroya, El Alamo, Magdalena, May 20, 1925, *Kennedy 7034* (Calif).

3b. Toxicodendron radicans (L.) Kuntze var. **littoralis** (Mearns) Barkl., n. comb.

Toxicodendron aboriginum Greene, Leafl. Bot. Obs. & Crit. **1:** 125. 1905.

Rhus littoralis Mearns, Proc. Biol. Soc. Wash. **15:** 148. 1902.

R. Toxicodendron forma *malacotrichocarpum* A. H. Moore, Rhodora **11:** 163. 1909.

Shrubs and vines with trifoliolate leaves; leaflets often broadly ovate, acute, usually entire but rarely crenate-dentate, usually subcordate at base; fruits distinctly pubescent; occurring with the species from Maine to Virginia and Oklahoma.

UNITED STATES:

Maine: Mount Desert Island, July 8, 1890, *Redfield* (M); Pemaquid Beach, Bristol, Sept. 9, 1898, *Chamberlain & Dinsmore 832* (G type of *R. Toxicodendron* forma *malacotrichocarpum*, M photo.).

Massachusetts: West Falmouth, Sept. 4, 1894, *Churchill* (M).

Rhode Island: Newport Co., Aug. 24, 1901, *Mearns 541* (ND), Sept. 10, 1901, *235* (US), and *233* (US type, M photo.).

Connecticut: Bridgeport, June 18, 1895, *Eames* (US).

New Jersey: Toms River, Aug. 8, 1909, *Mackenzie 4256* (M, US).

Pennsylvania: valley of the Lehigh River, Northampton, Aug. 21, 1923, *Churchill* (M).

District of Columbia: northeast of Washington, July 27, 1893, *Boettcher 250* (M).

Virginia: banks of Appomattox River near Petersburg, Aug. 22, 1908, *Rehder 1908* (M); near Hampton, July 22, 1927, *Churchill* (M); immediate vicinity of Colonial Beach, Aug. 2–3, 1912, *Tidestrom & Bartlett 5962* (M).

South Carolina: Anderson, July 29, 1920, *Davis 1796* (M).

Georgia: below Lula Falls, near Chattanooga, Tennessee, June 4, 1911, *Churchill* (M).

Florida: June and July 1898, *Hitchcock* (M); near Sirmans, May 16, 1925, *Palmer 27268* (M).

Indiana: about 2 miles northeast of Solon, June 20, 1923, *Deam 38907*, and Clark County State Forest about 4 miles northwest of Henryville, Aug. 22, 1923, *39791*, and west of New Albany, Sept. 1, 1912, *12314* (Deam); Notre Dame, 1909, *Nieuwland 2243*, and road to Red Mill, 1910, *2427* (ND); 2 miles southwest of Chrisney, Aug. 13, 1919, *Deam 28959*, also 4 miles southeast of Crossplains, June 19, 1915, *16182*, and Neuburn woods about 7 miles southwest of Evansville, Sept. 28, 1920, *33102* (Deam).

Oklahoma: Choctaw Agency, 1853, *Bigelow* (US type of *T. aboriginum*, M photo.).

3c. Toxicodendron radicans (L.) Kuntze var. **verrucosa** (Scheele) Barkl., n. comb.

Toxicodendron verrucosum Greene, Leafl. Bot. Obs. & Crit. **1**: 124. 1905.

T. rhomboideum Greene, *ibid.* 125.

R. verrucosa Scheele, Linnaea **21**: 592. 1848.

R. aromatica Lindh. ex Scheele, *ibid.* 593.

R. rhomboidea Small, Fl. Southeast. U. S., pp. 727, 1334. 1903.

Small shrubs with trifoliolate leaves; leaflets rhomboid-ovate, acute to acuminate, usually regularly and deeply incised-dentate, mostly glabrate except on veins and margins; fruit glabrous; occurring mostly in Texas.

UNITED STATES:

OKLAHOMA: bluff above Turner Falls, Murray Co., April 26, 1936, *Demaree 12294* (Okla).

TEXAS: near Brownwood, Oct. 31, 1924, *Palmer 26781,* also Brown Co., Nov. 1, 1924, *26821,* and Nov. 2, 1925, *29566* (M); Comal Co., 1840, *Lindheimer 127* (M), also 1845, *346* [*135*] (M, **cotype**), and Aug. 1846, *346* [*245*] (M); New Braunfels, 1847, *Lindheimer 346,* and 1851 (M); Comanche Peak, near Granbury, May 5, 1900, *Eggert,* and Sept. 16, 1914, *Palmer 6559* (M); Hood Co., Sept. 5, 1903, *Reverchon* (M); Spanish Pass, Kendall Co., May 23, 1916, *Palmer 9867* (M); Kerrville, April 25–30, 1894, *Heller 1670* (F, M, cotypes of *R. rhomboidea,* M photo.); Guadalupe River, near Kerrville, May 7, 1928, *Palmer 33803,* also Menard, May 12, 1917, *11898,* Trinity River near Fort Worth, Oct. 31, 1925, *29474,* Austin, April 1, 1916, *9329,* and Montell, Oct. 14, 1917, *12975* (M).

3d. Toxicodendron radicans (L.) Kuntze var. **eximia** (Greene) Barkl., n. comb.

Toxicodendron biternatum Greene, Leafl. Bot. Obs. & Crit. **1**: 124. 1905.

T. eximium Greene, *ibid.* 123.

Rhus eximia Standley, Contr. U. S. Nat. Herb. [Trees & Shrubs Mex.] **23**: 668. 1923.

R. Toxicodendron var. *eximia* McNair, Field Mus. Bot. Ser. **4**: 69. 1925.

Vines with trifoliolate leaves; leaflets broadly ovate, mostly acuminate, the terminal tending to be trilobate, the lobes rounded or rarely acutely incised-dentate, puberulent; fruit obscurely sparse-pubescent; occurring in Texas and Mexico.

UNITED STATES:

TEXAS: Bexar Co., April 8, 1935, *Parks B62* (M); Chisos Mountains, Brewster Co., May 23, 1928, *Palmer 34076* (M); Eagle Nest on the Rio Grande, Maverick Co., *Havard* (US type of *T. biternatum*, M photo.); Tarrant Co., Aug. 29, 1920, *Ruth 550* (F); Uvalde, April 30, 1928, *Palmer 33630* (F), also Devils River, Valverde Co., March 26, 1917, *11382*, and May 14, 1918, *13603*, and Pecos River, near Rio Grande, April 24, 1928, *33466* (M).

MEXICO:

DURANGO: Durango, April–Nov. 1896, *Palmer 106* (F in part, M, Calif, cotypes).

NUEVO LEON: San Agustin, alt. 800 m., Aug. 1911, *Abbot 246* (M).

Section VERNIX (Adanson) Schneider, Illustr. Handb. Laubholzk. **2**: 151. 1907.

Vernix Adanson, Fam. Pl. **2**: 342. 1763.

Deciduous trees or large shrubs, with comparatively few, rather stout branches. Flowers usually polygamo-dioecious in large, pendent, lateral, axillary panicles. Leaves alternate, thin, imparipinnately many-foliolate.

Eastern North America, Central America, northern South America, and southeastern Asia.

Type species: **Toxicodendron Vernix** (L.) Kuntze, Rev. Gen. Pl., pt. 1, p. 153. 1891 (*Rhus Vernix* L., Sp. Pl. **1**: 265. 1753).

For the most part VERNIX is a group of small trees and large shrubs. It is represented in North America by two species, but in Asia there are several species.

KEY TO THE SPECIES

Seed flat, comparatively smooth, about 6 mm. broad; Central and South America .... *4 T. striata*

Seed thick, rough, about 4 mm. broad; eastern North America .... *5 T. Vernix*

4. Toxicodendron striata (Ruiz & Pavon) Kuntze, Rev. Gen. Pl., pt. 1, p. 153. 1891. Pl. 25, fig. 2.

Rhus striata Ruiz & Pavon, Fl. Peruv., p. 29. 1802.

R. juglandifolia Willd. ex. Roem. & Schult. in L. Syst. Veg., ed. 15. **6**: 649. 1820.

R. juglandifolia var. *Lindeniana* Engler in DC., Monogr. Phaner. **4**: 401. 1883.

R. juglandifolia var. *Samo* Engler, *ibid.*

R. Samo Tulasne, Ann. Sci. Nat., Bot. III. **6**: 367. 1846.

R. Lindeniana Turcz., Bull. Soc. Nat. Moscou **31**: 468. 1858.

Trees and large shrubs with stout branches which are at first scurfy-pubescent; leaflets 11–17, broadly lanceolate, 5–10 cm. long, 2.7–4 cm. broad, abruptly acuminate at the apex, unequal and rounded at the base, thin, subrevolute, entire-margined, glabrous on both surfaces or slightly pubescent on veins below, dark and shining above, lighter and dull below, lateral leaflets with petiolules about 4 mm. long, terminal leaflet with petiolules about 2 cm. long, rachis segments about 4 cm. long; inflorescences large, lateral panicles, bracts lanceolate, about 0.8 mm. long, about 0.3 mm. broad, pubescent, deciduous; sepals semicircular, about 1 mm. broad, almost as long, glabrous; petals tan in the dried state, oval, 2.5 mm. long, 1.7 mm. broad, glabrous; anthers lanceolate, 2 mm. long, 1 mm. broad; filaments 1.5 mm. long; stigmas 3, styles almost entirely connate; fruit whitish, glabrous; seed about 5 mm. long, 7 mm. broad, 2 mm. thick.

Distribution: Vera Cruz, south to Brazil and Peru (fig. 30).

MEXICO: 1841–1843, *Liebmann 277* (Calif, M photo, US).

CHIAPAS: between Teneapa and Yajalon, alt. 3000–5000 ft., Oct. 13, 1895, *Nelson 3293* (US).

OAXACA: Cafetal Allianza, alt. 700 m., Aug. 1917, *Reko 3353* (US).

VERA CRUZ: Zacuapan, Aug. 1906, *Brandegee 2019* (US); Zacuapan, Aug. 9, 1906, *Purpus 2019* (Calif, F, M), and Oct. 1914, *7378* (Calif, F, M, US).

CENTRAL AMERICA:

GUATEMALA: ALTA VERAPAZ: Chicoyonito, alt. 4300 ft., April 1889, *Donnell Smith 1791* (US); COBÁN: June 1906, *von Tuerckheim II 1255* (US).

COSTA RICA: *Brenes 5032* (F); Las Cauras, Aug. 1919, *Lankester K296* (F); Cerro Jucosinal, March 3, 1928, *Stork 1095* (F); 2 miles southwest of Agua Caliente, April 1, 1928, *Stork 1328*, and near Novarro Valley, May 1, 1928, *1712* (F); ALAJUELA: San Ramon, Oct. 26, 1925, *Brenes 4552 (337)*, and bois La Palma de San Ramon, June 27, 1927, *5559 (151)* (F); CARTAGO: Rio Reventado, alt. 6000 ft., March 1887, *Cooper (Donnell Smith 5728)*, and *466 (5728)* (US); Alto de La Estrella, March 26–27, 1924, *Standley 39274* (US).

PANAMA: CHIRIQUI: forests around El Boquete, alt. 1000–1300 m., March 6, 1911, *Pittier 3029* (US).

SOUTH AMERICA:

COLOMBIA: CAUCA: highlands of Popayan, alt. 1600–2000 m., *Lehmann 6652*, Inza, *8462* (F); Huila, Rio Paez Valley, Tierra Odentro, alt. 1600–1900 m., Jan. 1906, *Pittier 1259*, El Saladito above Cali, road to Buenaventura, Western Cordilleras, Dec. 21, 1905, *763* (US); Cauca Valley, ''El Ramal'' to Rio Sucio west of Popayan, July 3, 1922, *Pennell & Killip 8089* (US); CUNDINAMARCA: Pecho, 1600–2400 m., Jan. 1906, *Lehmann 7561* (F, US); MAGDALENA: Santa Marta, June 1898–1901, *Smith 822*, also Sept. 1898–1901, *406* (F, M, US), and *824* (F, M).

VENEZUELA: between la Cortada del Guayabo and San Diego los Altos, alt. 25 km., July 2, 1928, *Pittier 13019* (US); LOS ANDES: Merida, Tabay, alt. 2000–2400 m., Oct. 14, 1930, *Gehriger 566* (US); MIRANDA: Alto del Guayabo, alt. 17 km., Caracas to Cua, April 17, 1924, *Pittier 11513* (US).

BRAZIL: Bahia, *Salzmann* (M).

PERU: Yanano, alt. 6000 ft., May 13–16, 1923, *Macbride 3787* (US); CUZCO: San Miguel, alt. 1800 m., May 26, 1915, *Cook & Gilbert 912* (US); Valle de Santa Ana, alt. 1000 m., May 1932, *Herrera 3483* (US).

5. **Toxicodendron Vernix** (L.) Kuntze, Rev. Gen. Pl., pt. 1, p. 153. 1891, as emended by Michaux.

Toxicodendron Pinnatis Mill., Gard. Dict., ed. 8. 1768; Willd., Sp. Pl. **1**: 1479. 1798 (as *Toxicodendron Pinnatum*).

T. Vernix Shafer in Britt., N. Am. Trees, p. 610. 1908.

Rhus Vernix L., Sp. Pl. **1**: 265. 1753, in part; Michx., Fl. Bor.-Am. **1**: 183. 1803.

R. Vernicifera Salisb., Prodr., p. 169. 1796, non DC., Prodr. **2**: 68. 1825.

R. venenata DC., *ibid.*

Rhus-Toxicodendron Vernix Marsh., Arbust. Am., p. 130. 1785.

Large shrubs; leaflets 5–11, narrowly oblong-ovate to subovate, abruptly acuminate at apex, cuneate at base narrowing into a short petiolule, subrevolute and entire-margined, glabrous above and below or somewhat pubescent below especially on the veins, dark green above, lighter below, 6–7 cm. long, 2.4–4.5 cm. broad, terminal petiolule about 2.7 cm. long, lateral petiolules about 0.9 cm. long, rachis segments about 4 cm. long; inflorescences lateral panicles, bracts lanceolate, about 0.7 mm. long, 0.2 mm. broad, almost glabrous, deciduous; sepals bluntly deltoid-lanceolate, 1.3 mm. long, 0.7 mm. broad, glabrous; petals oblanceolate, 2 mm. long, 0.5 mm. broad, glabrous; anthers oblong, 1 mm. long, 0.6 mm. broad; filaments about 1.8 mm. long; stigmas 3, styles almost entirely connate; fruit whitish, glabrous; seed 3.5 mm. long, 5 mm. broad, 2.9 mm. thick, longitudinally deeply striate.

A virulently poisonous shrub of rather uniform morphology, found characteristically in the swamps of eastern North America.

Distribution: on the coastal plains from New Hampshire to Florida and Texas, and in the Great Lakes region (fig. 30).

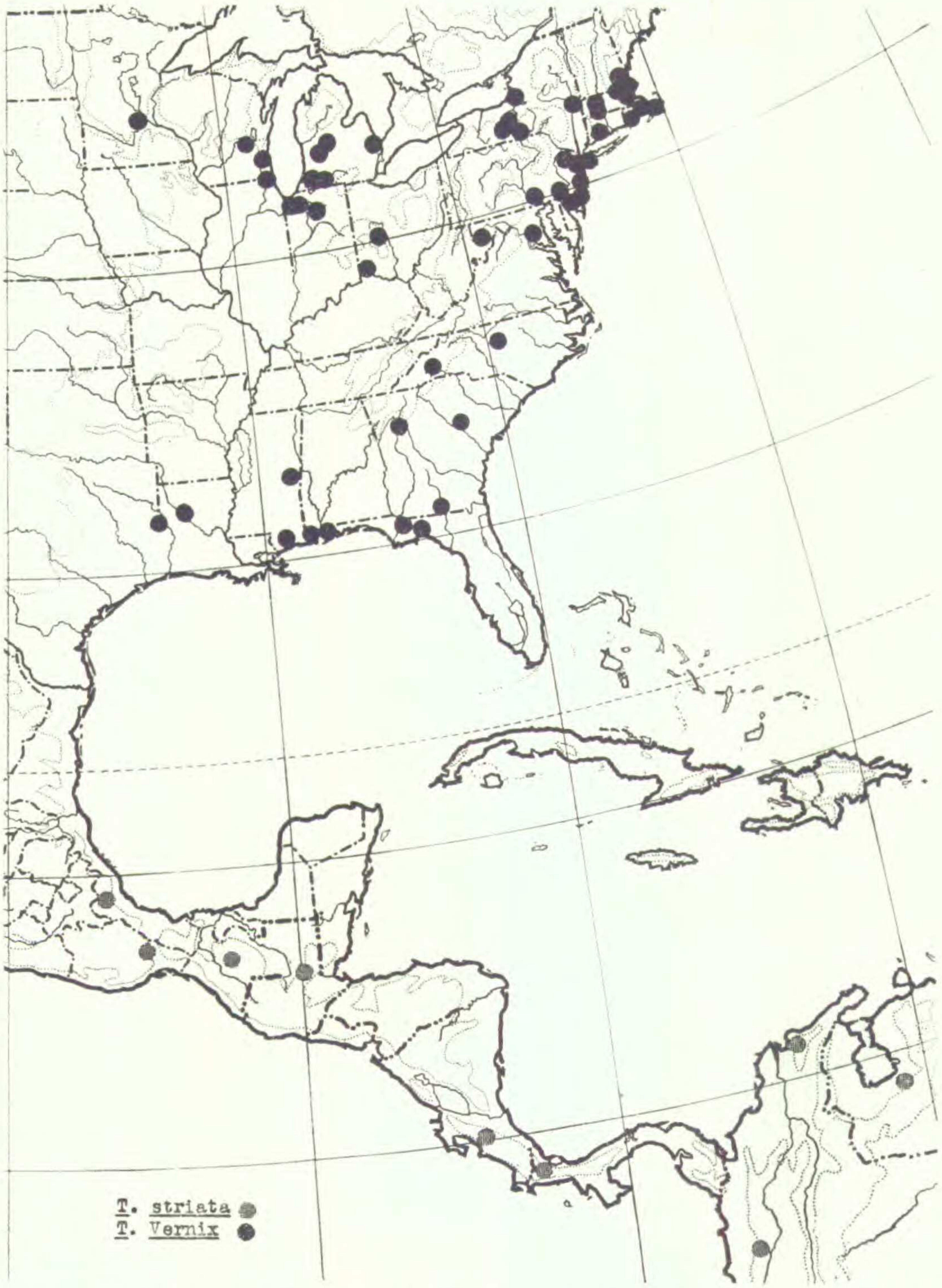

Fig. 30. The geographic distribution of *Toxicodendron striata* (Ruiz & Pav.) Kuntze and *T. Vernix* (L.) Kuntze.

UNITED STATES:

New Hampshire: Fremont, Sept. 14, 1927, *Batchelder* (M).

Massachusetts: Hyannisport, July 5, 1896, *Churchill* (M); Nonquitt, 1888, *Sturtevant* (M); Southwick, Sept. 12, 1914, *Seymour 280* (M); Amherst, July 11, 1874, *Bishop* (F); Amherst, June 9, 1880, *Clark* (F); Cambridge, *ex Engelmann Herb. 15572*, and environs of Cambridge, Oct. 1856, *15582* (M); near Cambridge, Oct. 1856, *Engelmann* (M); Concord, Oct. 24, 1897, *Greenman 2395* (M); Framingham, Aug. 1893, *Smith* (M); Milton, June 20, 1870, *Churchill*, and West Quincy, June 29, 1898, and Dorchester, June 24, 1882 (M).

Rhode Island: Warwick, Aug. 16, 1873, *Congdon* (F).

Connecticut: New Haven, 1836, *ex Buckley Herb.* (M).

New York: Mutton Hill, *Millspaugh* (F); near New York City, *Holton* (F); Oswego, July 18, ?, *Webbe* (ND); Troy, 1828–1834, *Hall* (F); Ovid, June 30, 1858, *Brewer & Chickering* (F), May 1857, *Chickering* (M); Indian Spring, Ithaca, July 22–26, 1878, *Trelease* (M); Michigan Hollow Swamp, Danby, July 23, 1919, *Wiegand 12397* (M); Penn Yan, *T.* (M).

New Jersey: *Dean* (M); Atsion, June 16, 1866, *Redfield* (M); Camden, Aug. 1878, *Martindale* (M); Secaucus, Sept. 2, 1876, *Schrenk*, and Keyport, June 24, 1876 (M); Franklin, July 1879, *Rusby* (M).

Pennsylvania: July–Aug., 1883, *Galen 361* (M); Sept. 17, 1868, *Rothrock* (F); Dillerville Swamp, Sept. 27, 1892, *Heller 525* (F, M); Smithville Swamp, June 17, 1889, *Small* (F), also June 29, 1889 (M), Aug. 30, 1889, and Sept. 18, 1889 (F); Germantown, 1876, *Letterman* (M); York Co., Sept. 19, 1899, *ex Glatfelter Herb.* (M).

Delaware: Rehoboth Beach, Sept. 5, 1908, *Churchill* (M).

District of Columbia: in the vicinity of Washington, May 30, 1876, and Sept. 20, 1874, *Ward* (M); near Washington, June 188?, *McCarthy* (F).

North Carolina: Biltmore, June 16 and Oct. 2, 1897, *ex Biltmore Herb. 1337b* (F, M); Flat Rock, Aug. 1842, *Buckley* (M); Chapel Hill, *Ashe* (M).

South Carolina: near Graniteville, May 21, 1899, *Eggert*, also May 23, and May 24 (M).

Georgia: west base of Stone Mountain, July 4, 1893, *Small*, and along Withlacoochee River, near Valdosta, June 6–12, 1895 (F).

Florida: Adamsville, Oct. 15, 1894, *Curtis* (F); near Quincy, April 10, 1929, *Palmer 35246* (M); inter Tallahassee et fluv. Ocklocknee, July 1843, *Rugel* (M).

Alabama: Hugger's Reservation, Baldwin Co., July 24, 1934, *Lemeric* (ND); Gateswood, May 2, 1903, *Tracy 8742* (F, M); Auburn, May 29, 1897, *Earle & Baker* (M); Spring Hill, Aug. 6, 1897, *Bush 231* (M).

Mississippi: southern Mississippi, May 1867, *Hilgard* (M); Biloxi, July 6, 1897, *Tracy 3426* (M); near Kewanee, May 14, 1925, *Palmer 27185* (M).

Louisiana: Chopin, April 21, 1915, *Palmer 7239*, and May 6, 1915, *7542* (M).

Ohio: Urbana, Sept. 15, 1935, *Demaree 11696* (M); near Cincinnati, 1836, *Short* (M).

West Virginia: near Elk Garden, Aug. 20, 1930, *Berkley 1639* (M).

Michigan: Sugarloaf Lake, June 16, 1903, *Burgess 170*, and tamarack swamp, Oct. 3, 1903, *467* (F); Ross, July 10, 1889, *Sones* (M); near Peirson, June 18, 1933, *Palmer 40445* (M); Port Huron, July 1891, *ex Glatfelter Herb.* (M); near

Port Huron, July 4 and Aug. 4, 1895, *Dodge* (F); Flowerfield, June 8, 1903, *Burgess 111* (F); Lawton, Sept. 28, 1909, *Nieuwland 9018* (ND).

Indiana: east of East Chicago, June 19, 1900, *Bebb 319* (F); Miller's, June 18, 1877, and June 8, 1878, *Grassly,* also Sept. 22, 1900, *Lansing 1215,* and June 19, 1897, *Umbach,* and Oct. 1, 1898 (F); near Miller's, Sept. 22, 1901, *Millspaugh 27* (F); Hank's Marsh, Lake Maxinkuckee, Oct. 13, 1906 (ND); Tremont, the dunes of Lake Michigan, Chesterton, Aug. 22, 1925, *Churchill* (M); Dune Park, Aug. 29, 1911, *Hill 27* (F); near Porter, Sept. 16, 1903, *Lansing 1623* (F); Mineral Springs, June 24, 1916, *Nieuwland* (ND).

Kentucky: coll. of 1840, *Short* (M).

Wisconsin: Jefferson Co., Sept. 1869, *Greene* (ND); Milwaukee Co., coll. of 1861, *Lapham* (M).

Illinois: near Long Lake, Sept. 5, 1925, *Palmer 29304* (M).

Minnesota: Nov. 1891, *Douglass* (M); Lake Harriet, Minneapolis, Aug. 1894, *Anderson* (F).

Texas: San Augustine, April 2, 1918, *Palmer 13261,* and Sept. 20, 1918, *14471* (M).

Excluded and Doubtful Species

Rhus antillana Eggers, Fl. St. Croix and Virg. Isl., p. 41. 1879 = **Picrasma antillana** (Eggers) Urban, Symb. Antil. **5**: 378. 1908.

Rhus arborea DC., Prodr. **2**: 73. 1825 = *Toxicodendron Arboreum* Mill., Gard. Dict., ed. 8. 1768 = **Schmidelia Cominia** Swartz, Fl. Ind. Occ. **2**: 667. 1800.

Rhus arborescens DC., Prodr. **2**: 73. 1825 = **Schmidelia** sp.

Rhus catawbiense Just's Bot. Jahresber. **39**^{1}: 969. 1911, in error = **Rh[ododendron] catawbiense** Michx. in Engler & Drude, Veg. der Erde **8**: xxxvii. 1911.

Rhus crenatifolia Schlecht., Linnaea **16**: 483. 1842, apparently belongs in section Lobadium, but its exact status must remain undetermined until examination of the type: *Schiede,* Tula, Sept.

Rhus Florita Jones, Contr. West. Bot., No. 18, p. 22. 1935 = **Sapindus marginatus** Willd., Enum. Pl. Hort. Berol., p. 432. 1809.

Rhus Cavanillesii DC., Prodr. **2**: 69. 1825 = **Rhus lucida** L., Sp. Pl., p. 382. 1753.

Rhus metopioidea Turcz., Bull. Soc. Imp. de Moscou **31**^{1}: 468. 1858. The author has been unable to obtain the type, *Linden 1799*, or authentic material of this species, so that it yet remains doubtful.

Rhus peregrina (Buc'hoz) Stapf, Ind. Lond. **1**: 113. 1929 = **Ailanthus altissima** (Miller) Swingle, Jour. Wash. Acad. Sci. **6**: 495. 1916.

Rhus perniciosa HBK., Nov. Gen. & Spec. **7**: 10. 1824 = **Pseudosmodingium perniciosum** (HBK.) Engler, Bot. Jahrb. **1**: 419. 1881.

Rhus polyantha Benth., Pl. Hartw., p. 60. 1840 = **Picramnia polyantha** Planch., Hook. Lond. Jour. Bot. **5**: 577. 1846.

Rhus Pterocarpus Sessé & Moc., Pl. Nov. Hisp., p. 47. 1887 = **Pseudosmodingium rhoifolium** (DC.) Barkl., Ann. Mo. Bot. Gard. **24**: 500. 1937.

Rhus Succedaneum Buc'hoz, Herb. Col. Am., *pl. 57*. 1783, non. L., 1767 = **Ailanthus altissima** (Miller) Swingle, Jour. Wash. Acad. Sci. **6**: 495. 1916.

Rhus Veatchiana Kellogg, Proc. Calif. Acad. Sci. **2**: 24. 1863 = **Pachycormus discolor** (Benth.) Coville, Contr. U. S. Nat. Herb. **16**: 344. 1916.

Due to the inadequacy of the original description or failure to cite specimens, the disposition of the following names must remain doubtful, at least for the present:

Rhus fruticosum Sessé & Moc., Fl. Mex., p. 84. 1887.

R. heterophyllum DC., Cat. Pl. Hort. Bot. Monsp., p. 136. 1813.

R. lineata Spreng. in L. Syst. Veg., ed. 16. **1**: 936. 1825.

R. lineatifolia Ortega, Hort. Matr., Dec. 7, p. 89. 1800.

R. macrophylla Hook. & Arn., Bot. Beechey's Voy., p. 413. 1840 = *Toxicodendron macrophyllum* (H. & A.) Kuntze, Rev. Gen. Pl., pt. 1, p. 154. 1891.

R. refescens Desv. ex Ham., Prodr. Pl. Ind. Occ., p. 32. 1825.

R. saxatilis DC., Prodr. **2**: 71. 1825.

R. schinoides Willd. ex Roem. & Schult. in L. Syst. Veg., ed. 15. **6**: 649. 1820.

R. tetlatin Kraemer, Bull. Pharm. **11**: 174. 1897.

R. variifolium DC., Prodr. **2**: 73. 1825.

SUMMARY

On the basis of a critical morphological study, six genera, fifty-two species, and twenty-one varieties are recognized in the Rhus-complex of North America. The recognized genera are: *Actinocheita, Cotinus, Malosma, Metopium, Rhus,* and *Toxicodendron.* Nine new species and five new varieties are described, one new name proposed, and eight new varietal combinations made.

LIST OF EXSICCATAE

The distribution numbers are printed in *italics;* unnumbered collections are indicated by a dash. The numbers in parenthesis are those of the species and varieties in the genera treated in this study.

ACTINOCHEITA
Abbott, Mrs. Gordon. *11* (1).
Conzatti, C. *2019, 4247* (1).
Gonzalez, V. & C. Conzatti. *937* (1).
Haenke, Thaddaeus. *1503* (1).
Nelson, E. W. *1593, 1825* (1).
Pringle, C. G. *4752, 9164* (1).
Purpus, C. A. *1236, 4065 p.p., 5702* (1).
Rose, J. N., Walter Hough & J. H. Painter. *9967* (1).
Seler, Caec. & Ed. *1419* (1).
Smith, Rev. Lucius C. *777* (1).

COTINUS
Buckley, S. B. —, — (1).
Bush, B. F. *21, 50, 64* (1).
Canby, W. M., C. S. Sargent & J. Muir. *22* (1).
Clemens, Mr. & Mrs. J. — (1).
Demaree, Delzie. *3040, 6406* (1).
Eggert, H. — (1).
Geol. Surv. Ala. Herb. — (1).
Harper, Roland M. *3230* (1).
Kellogg, John H. *15221* (1).
Mackensen, G. *8* (1).
Mohr, Charles. —, —, —, —, *23* (1).
Nuttall, Thomas. — (1).
Palmer, E. J. *4710, 4723, 5856, 5971, 9865, 10556, 19219, 19253, 24612, 26187, 27085, 32914, 33313, 34732, 34793, 39482* (1).
Reverchon, J. *1643* (1).
Sayres, F. W. — (1).
Shimek, B. — (1).
Steyermark, Julian A. *13595* (1).
Trelease, W. *257, 258* (1).
Wheeler, H. E. *358* (1).
Wideman, Mr. & Mrs. — (1).

MALOSMA
Abrams, LeRoy. *2639, 4154* (1).
Anderson, R. D. — (1).
Anthony, A. W. —, *28, 122* (1).
Barber, J. H. — (1).
Blake, S. F. *439* (1)
Blankinship, J. W. — (1).
Brandegee, Katherine. — (1).
Brandegee, T. S. —, —, —, —, —, *112* (1).
Brown, — (1).
Carter, Annetta M. *955* (1).
Clokey, Ira W. & Bonnie Templeton. *4588* (1).
Davis, A. R. — (1).
Drent, Harry. — (1).
Drushel, J. A. — (1).
Eastwood, Alice. *130, 204, 12416* (1).
Eby, A. F. — (1).
Elmer, A. D. E. *4015* (1).
Engelmann, George. —, — (1).
Fish, Fanny E. — (1).
Franceschi, F. *9* (1).
Grant, Geo. B. *1117* (1).

Hiatt, O. T. — (1).
Knopf, Ezra C. *164, 238, 502* (1).
Mason, H. L. *1981* (1).
Millspaugh, C. F. *4460* (1).
Nuttall, L. W. *309, 1157* (1).
Orcutt, C. R. — (1).
Palmer, Edw. 48 (1).
Parish, S. B. *4462* (1).
Parish, S. B. & W. F. Parish. —, *1928* (1).
Parry, C. C., & J. G. Lemmon. *43* (1).
Pond, Lt. Chas. F. —, — (1).
Robertson, Geo. *46* (1).
Rusby, H. H. *401* (1).
Smith, Huron H. *4458, 4988, 5164, 5227, 5319* (1).
Snyder, Mary S. — (1).
Torrey, John. *75* (1).
Trask, Blanche. — (1).
Wheeler, Louis C. *2277* (1).
Wiggins, I. L. & D. Demaree. *4760* (1).
Wiggins, I. L. & D. K. Gillespie. —, *3874* (1).

METOPIUM

Abbott, W. L. *1251, 1271* (2).
Bartlett, H. H. *12695* (3).
Brace, L. J. K. *1976, 4500, 4962* (2).
Britton, N. L. *241* (2).
Britton, N. L. & C. F. Millspaugh. *2514* (2).
Britton, N. L. & J. A. Shafer. *3080* (3).
Campbell, E. *5753, 6195* (3).
Carter, J. J. & J. K. Small. *2134* (2).
Chapman, A. W. —, *38* (2).
Curran, H. M. & M. Haman. *148* (3).
Curtiss, A. H. *33, 448, 5477, 5638* (2).
Duckett, Francis. —, 230 (2).
Eggers, — (2).
Ekman, E. L. *3513* (1); *3644* (2); *5869, 6297, 7062, 9867* (3).
Fuertes, Fr. *32* (3).
Garber, A. P. — (2).
Gaumer, G. F. *601, 1867* (3).
Gaumer, G. J. *23223, 23974* (3).
Gaumer & Sons. *23674* (3).
Gentle, Percy H. *102, 1212, 1352* (3).
Harris, Wm. —, *6416, 9224, 11766* (3).
Hitchcock, A. S. —, —, —, —, —, —, —, *329, 330* (2).
Jack, J. G. *7925* (2).
Lansing, O. E., Jr. *2020* (2).
Leon, F. *11802* (2).
Leonard, Emery C. *11933* (3).
Leonard, Emery C. & Genevieve M. Leonard. —, *11193, 12338, 13085, 13374, 13966, 14074, 14865, 15338, 15650* (2).
Lundell, C. L. *2056, 9110* (2); *592, 2080, 2459, 3063, 3534* (3).
Maxon, Wm. R. & Ellsworth Killip. *1577* (3).
Millspaugh, C. F. *25* (3).
Millspaugh, C. F. & C. M. Millspaugh. *9110* (2).
Moldenke, Harold N. *778a* (2).
Myers, Wm. C. *176* (3).
Nash, Geo. V. & Norman Taylor. *969, 1136, 1327, 1424* (2).
Northrop, John I. & Alice R. Northrop. *552* (2).
Pacheco, M. *1485* (3).
Palmer, E. J. *27505* (2).
Palmer, Edw. *97* (2).
Pollard, C. L., G. N. Collins & E. L. Norris. *95* (2).
Roig, J. T. *118* (1).
Rothrock, J. T. *513* (2).
Schipp, W. A. *540* (3).
Shafer, J. A. *287, 671* (2); *1317* (3), *2431, 2807* (2); *3158, 4192, 4323, 7737, 8306* (1); *11120* (3).
Simpson, J. H. *227* (2).
Sintenis, P. *528, 4800* (2).
Small, J. K. & J. J. Carter. —, *8672* (2).
Valeur, E. J. *698, 860* (2).
Webber, H. J. *269, 339* (2).
Westgate, J. M. — (2).
Wight, A. E. *220* (2).

Wilson, Percy. *7502, 7747, 7774, 8034, 8227* (2).
Wright, Charles. *2287, 2288* (1); *2289* in part (2); *2289 p.p.* (3).

RHUS

Abrams, LeRoy. *1310* (41g); *2559* (22); *3113* (41g); *3307* (20); *3719* (22).
Abrams, LeRoy & Ira L. Wiggins. *80* (20).
Adams, J. W. *851* (6).
Alameda, *236* (16).
Allen, Paul. — (37).
Anchorage, S. E. & G. D. Hanna. — (17).
Anderson, Edgar. —(1).
Anderson, F. W. — (41).
Anderson, H. & Carl C. Epling. — (22).
Anderson, J. P. — (40).
Andrieux, M. *271* (31).
Anthony, A. W. —, —, *98, 305,* (17); —, *318A* (20).
Archibald, Jennie M. *A165* (41).
Arsène, Bro. G. — (18); — (41); *7* (10); *9* (19); *1850, 1907, 2066* (18).
Arsène & Amable, Bros. *1566, 2255* (10); *3597* (18).
Ashe, William Willard. —, *239* (3), — (6); *825* (7); — (40).
Austin, Mrs. R. M. —, —, *767* (41d).
Bailey, Vernon. —, *304* (22).
Baker, Carl F. — (1a); — (40); —, —, —, *406, 456, 919* (41); *4147* (22); *4156* (20); *4734* (41g).
Baker, C. F., F. S. Earle & S. M. Tracy. *525* (41).
Baker, H. P. — (1); —, *122* (6); — (41).
Baker, M. & W. H. Dall. — (20); *17* (20).
Baker, M. S. & Frank Nutting. — (41g).
Barber, J. H. *191* (41g); *289* (20); *311* (22).
Barkley, Elizabeth Ducker. *198* (6); *229* (1).
Barkley, Fred A. —, — (41); —, *414* (1); *415* (6); *1074* (37); *1075* (2); *1084* (6); *1092* (1); *1150* (40).
Barkley, Robert W. I & II. *2* (40).
Barkley, William Webster. — (6); — (41a).
Barlow, Bronson. — (41); — (41f); — (41g).
Barrows, D. P. — (22).
Bartlett, Harley Harris. *1153* (1a); *10269* (2); *10281* (6); *10308* (31); *10491* (2); *10953* (31).
Batchelder, Charles Foster. — (1); — (6).
Bayliff, William. — (1).
Beard, A. — (41); — (41f).
Beattie, Frederick S. —, — (6).
Bebb, Robert. *326* (4).
Bennitt, Dorman. *129* (41).
Benson, Lyman. *1312* (6).
Berg, N. K. —, —, — (20).
Bergman, H. F. — (6); — (41).
Berkley, Earl E. *846, 986* (6); *1655* (40).
Berlandier, J. L. *2362* (29).
Bessey, Ernst A. *117* (1a).
Bethel, Ellsworth. —, *8, 9* (41); — (41g).
Bettis, Mrs. James R. — (40).
ex Biltmore Herb. — (3); *869a* (40); *870, 870a* (4); *872, 872b* (3); *1378, 1378b* (6); *3284a* (1).
Bissell, C. H. *40, 467* (4).
Blair, R. E. *217* (37); *231* (29).
Blaisdell, F. E. — (41d).
Blake, J. — (4).
Blake, S. F. *824* (22).
Blakley, O. W. *1516* (1).
Blanchard, Ferdinand. — (1); —, — (4); —, —, — *p.p.* (6).
Blankinship, J. W. — (20); — (40); —, — (41g); *667* (41).
Blatchley, W. S. — (41b).
Blazic, Antone. — (40).

Blumer, J. C. — (30); — (41f); *94* (37); *96, 98, 98b, 1267, 1293* (6); *1319* (41d); *1320* (41f); *1321* (41c); *1322* (37); *1323* (39); *1324* (41c).
Bolander, H. N. — (41g).
Booth, *94* (41g).
Bourgeau, M. *1476, 1892* (16).
Brandegee, Katherine. —, — (20); — (22).
Brandegee, T. S. —, —, — (17); —, —, —, —, — (20); —, —, —, —, —, —, —, — (22); —, — (33); — (41e); *111* (33); *818* (20); *910* (6).
Braunton, Ernest. *203* (41d); *360* (22); *389, 390* (20); *487* (41d); *1026* (22).
Brendel, F. — (40).
Brewer & Chickering, — (40).
Bright, John F. & Catherine Wyman. *8005* (20).
Britton, N. L., F. S. Earle, & C. S. Gager. *6762* (1a).
Broadhead, G. C. — (1).
ex Broadhead Herb. — (6).
Bross, Mason. — (4); — (6).
Brown, H. E. *595* (41g).
Bruner, W. E. — (6); —, — (41).
Buckley, S. B. — (4).
Buell, M. F. *489* (6).
Buffum, B. C. —, *170* (41).
Bull, Rotha. *187* (6).
Burgess, A. B. *24* (4).
Burk, Myrel. *638* (6).
Burnell, L. — (22).
Bush, B. F. — (1); — (6); *62* (40); *92* (41a); *139* (6); *142* (1); *147* (6); *148* (41a); *170* (6); *175* (1); *180* (40) *259* (41e); *270* (1); *612, 688* (41); *689* (40); *885* (1); *1116* (2); *1117, 3164* (1); *3225, 3927* (41a); *3928* (40); *4139* (41a); *4162* (40); *5512, 6676* (41a); *9521, 9627, 9728* (40); *9729, 10033, 10050, 10052, 10054, 10064, 10066* (41a); *10113* (6); *10127* (40); *10146* (1); *10225, 10230* (40); *10244, 10244A, 10249, 10258, 10259* (41a); *11442, 12117, 12805* (40); *13350* (41a); *13492* (40); *14001, 14038* (41a); *14145, 14146, 14179, 14180, 14227* (40); *14229, 14269, 14649, 14656, 14657* (41a); *14730, 14740* (40); *15264, 15301, 15321, 15598, 15599, 15608, 15609, 15673* (41a).
Butler, B. T. *4123* (41).
Butler, George D. —, *40, 78* (41); — (41e); *1615* (41g).
Calderón, Salvador. *2500* (16).
Calkins, William Wirt. *295* (40).
Camp, S. H. & D. R. Camp. — (6).
Carlos, Hengo & C. Conzatti. *1886* (31).
Carlson, John I. — (41); — (41f).
Carpenter, Dana S. — (40).
Carr, W. P. *95* (6).
Castetter, E. F. *1421, 2122* (41).
Chandonnet, Z. L. — (6).
Chaney, Ralph W. *152* (4).
Chamberlain, E. B. — (4).
ex Chapman Herb. — (1a); — (6).
Chase, Agnes. *1067* (41b).
Chase, Virginius H. *57, 80* (6).
Child, Marion. *552* (41).
Churchill, J. R. —, —, —, —, — (1); —, —, —, —, — (4); — (5); —, —, —, — (6); —, —, —, —, — (40); — (41); — (41b).
ex Churchill Herb. — (6).
Clark, Jasper A. — (41a).
Clark, H. Walton. —, — (1); —, —, — (4); — (5); — (6).
Clark, Ora M. —, *2705* (40); *2720* (1).
Clemens, Mr. & Mrs. J. — (29); —, *831* (41); *834* (29); *835* (37).
Clemens, Mrs. Joseph. —, — (41).
Clements, F. E. & E. S. Clements. *32* (41); *188* (20).
Cleveland, D. — (20).
Clifton, R. L. *73* (1); *99* (6).
Clinton, G. W. — (40).
Clokey, Ira W. *4994* (20).

Clokey, Ira W. & Bonnie Templeton. *4431* (22); *4605* (20).
Clothier, G. L. *74b* (40).
Clute, Willard N. *105* (41).
Collins, G. N. & J. H. Kempton. *192* (20).
Collom, Rose E. *297* (22); *351* (41f).
Commons, A. — (6a).
Congdon, J. W. — (41g).
Conzatti, C. *826* (16); *1579, 1640, 1655* (18); *4205* (10); *4293, 4988* (18).
Conzatti, C. & V. Gonzalez. — (11); *1046* (12).
Cook, C. F. *9* (16); *43* (26); *55* (15); *76* (32); *83* (15).
Cooper, Juan J. *348* [*5729*] (15); *376* (20).
Cooper, W. S. *410* (41).
Cota, F. M. — (22).
Coues, E. & Edward Palmer. *287* (41f).
Coulter, J. M. *780* (31).
ex Herb. Coulter. — (41).
Coville, Frederick V. & Frederick Funston. *110* (22); *618* (41f).
Cowen, J. H. — (6); *95* (6).
Cowles, Henry C. *216* (6).
Craig, Moses. — (1); — (6).
Crandall, E. S. *1251* (41).
Cratty, J. R. — (4).
Crawford & Hiatt, — (22).
Creighton & Gilchrist, — (41).
Curtiss, A. H. *5129* (1a).
Cutler, Hugh. *607* (40).
Daniels, Francis. *221* (6).
Davis, Charles A. — (6b).
Davis, Rev. John. — (1); — (1a); — (6); *348, 718* (40); *722* (6); *993, 1238, 2332, 2418, 2646, 2991* (40); *3218* (1); *3497, 3497A, 3509, 3708* (40); *3898, 4407* (6); *4519, 5281* (1); *7615* (40); *7776, 7878, 8409* (1).
Davy, J. Burtt. *2769* (20).
Deam, Charles C. — (1); — (4); —, —, — (40); *1716* (1); *5421, 7030, 7034, 7872, 8990, 8991, 9358* (6); *9578* (41b); *14956* (6); *15082, 16239* (40); *17576* (4); *17945* (6); *17998* (41b); *27530* (40); *31347* (6); *31355* (40); *31736, 33348* (6); *33439* (40), *34379* (6); *37053* (1); *39245* (5); *39669* (1); *39749* (41b); *40565* (6); *44460, 45717* (40); *46970* (4); *47434, 53329* (1).
Deam, Mrs. Charles C. *28718* (4).
Demaree, Delzie. *4129* (1); *4988, 6410, 6629* (41a); *6950* (1); *6958* (6); *7764* (41); *8335* (6); *9511* (40); *10328* (1a); *10791, 10905* (1); *10906* (6); *11670* (4).
Dewait, — (1).
Dodds, G. S. *2099, 2106* (41).
Dodge, Charles K. — (40); *111* (6).
Donnelly, S. S. *38* (41f).
Dorman, J. B. — (41a).
Drouet, Francis. *408* (41a); *409* (40).
Drushel, J. A. — (4a); *3164* (41); *4028* (40); *5351* (1).
Duesner, C. W. — (41b).
Duncan, Mrs. J. T. *40* (41).
Dunhan, William H. — (4); — (4a); — (41).
Dunn, G. W. — (20); — (22); *7309* (20).
Dunn, N. & A. M. Martin. — (41f).
Duran, Victor. *3498* (22).
Dutton, D. Lewis. — (1); — (6).
Earle, F. S. — (41).
Earle, F. S. & C. F. Baker. — (1a).
Eastwood, Alice. — (41d); *22* (41); *78* (22); *133* (20); *227* (41); *679* (41g); *2160* (22); *2819* (41g); *3643* (41); *3763* (41e); *4937, 4952* (41g); *5069, 5306, 5408, 5553, 5583, 5610* (41); *5695* (41e); *5892* (41g); *5941* (41); *5974, 5976, 6034* (41e); *6098, 6099, 7093, 7228, 7702, 8196, 8406, 8407* (41); *8749* (41f); *8776* (22); *8794* (41f); *8953* (41); *9185* (41g); *9436, 9473* (41f); *11178, 12898* (41g); *15541* (41); *15556* (41d); *15718* (41f); *15763* (41); *15843* (22); *15870* (41f);

15883 (22); *15884* (41e); *16614* (22); *16615, 16663* (41f); *16691* (41g); *16786* (22); *17462* (41f); *17463* (41d); *18372* (22); *18381* (41f).

Eastwood, Alice & John Thomas Howell. *408, 579, 778* (41); *1015* (41f); *1016* (41e).

Eaton, D. C. *112* (41).

Eby, A. F. —, —, — (1); —, — (6).

Eby, J. H. — (1).

Edwards, J. B. *F-257* (15); *754* (16).

Eggert, H. —, —, —, —, —, —, —, — (1); — (1a); —, —, —, —, —, —, — (6); — (29); —, —, —, — (37); —, —, —, —, —, — (40); —, —, —, —, —, —, — (41).

Eggleston, Willard W. —, — (40); *15214, 16146, 16688* (41); *19580* (20).

Ehlers, J. H. — (6b); *822* (40).

Ellis, Charlotte C. *254* (41); *256* (6).

Elmer, A. D. E. *872* (6); *3680* (41f, 41g); *3898* (20); *3904* (22).

Emig, W. H. *247* (40); *367* (41).

Engelmann, George. —, —, — (1); — (6a); —, — (20); — (30); — (40); — (41); — (41g).

ex Engelmann Herb. — (6a).

Epling, Carl C. — (22); — (41g).

Epling, Carl C. & Lincoln Ellison. — (20); — (22).

Epling, M. & Carl C. Epling. — (41g).

Eskew, C. T. *1355* (41).

Ewan, Joseph Andorfer. *4203* (22).

Fendler, A. *99a* (41); *110* (6); *112* (41).

Fernald, M. L. *242* (4).

Ferris, Roxana S. *1211* (41); *1531* (41g); *7983* (41f); *8513* (20); *8514* (20).

Ferris, Roxana S. & Rimo Bacigalupi. *8080* (41f).

Ferris, Roxana S. & Carl D. Duncan. *2294* (41d); *2343* (37); *3277* (6); *3349, 3442* (41).

Fielder, Mary. — (6); — (41); *38* (6).

Fisher, George L. —, *38* (41); *43* (41f).

Fisk, V. C. — (41).

Fitzpatrick, T. J. & M. F. L. Fitzpatrick. — (6); — (41).

Fleming, G. L. & W. W. Eggleston. *19684* (20).

Fogg, John M., Jr. — (1); — (5).

Ford, A. B. — (4).

Foreman, — (40).

Forwood, W. H. *59* (41).

Fowler, J. — (40).

Fremont's Expedition to California. *49* (41g).

Fritchey, J. Q. A. — (20).

Frost, W. D. — (6).

Fry, L. S. — (41a).

Galen, James. *362* (1).

Galeotti, H. *2515* (12); *7247F* (11).

Garber, A. P. — (1a).

Garische, E. F. — (6).

Gates, Frank C. *746* (6); *15866* (5); *18776* (41a).

Gates, Frank C. & R. R. Sleeper. *1811, 1815* (6).

Gattinger, A. — (6).

Gentry, Howard Scott. *1746* (33).

Gershoy, A. *8419* (4).

Ghiesbreght, A. *511* (26a).

Gillespie, John W. — (22); *4894* (6); *4920, 5032* (1); *5573* (22).

Glatfelter, N. M. — (1).

ex Glatfelter Herb. —, —, —, —, —, — (1); — (2); — (6); —, —, — (41).

Goldman, E. A. *791* (26a); *883, 894* (32); *917* (16); *1120* (22); *1187* (41e); *2311* (21).

Goodding, Leslie N. *614* (41f, 41g); *680* (41); *832* (41e); *968* (30); *988* (6); *1053* (41d); *1129* (6); *2153* (41g); *2236* (37).

Goodman, George Jones. *759* (41); *2252* (2).

Goodman, George Jones & C. Leo Hitchcock. *1146* (37).

Gordon, A. *92* (41).
Gorman, M. W. *632* (6).
Gowan, Robert L. *73* (1).
Grant, George B. *1118* (20); *1119* (41d); *1120, 1356* (20); *2443* (22).
Grant, M. L. *2977* (4).
Grassl, Carl B. *174* (2).
Grassly, C. W. — (6); — (41b).
Gregg, Josiah. *378, 483* (37), *600* (18).
Greene, Edward L. —, — (1); —, —, —, —, —, —, —, —, —, — (4); —, —, — (5); —, —, —, —, —, —, —, —, — (6); — (6b); — (20); — (22); —, —, —, — (41); — (41e); — (41g).
Greenman, Jesse More. —, — (1); — (40); *1822* (6); *2104, 2145, 3174, 3175* (1); *4536* (40).
Greenman, Jesse More & Milton T. Greenman. *6015* (41).
Griffin, Millard & Delzie Demaree. *43* (6).
Griffiths, David. *4463* (41g); *6060* (30).
Griggs, Thomas. *44* (1).
Groth, B. H. A. *1* (41).
Gurney, J. — (1).
Guttenberg, G. *442* (4).
Haas, W. H. *11* (41).
Haenke, Thaddaeus. *1245* (16); *1504* (16).
Hahn, L. — (18).
Hall, Elihu. —, *75* (41); *76* (29); 77 (1).
Hall, H. M. *875* (22); *978* (20); *2828* (22); *8288* (20).
Hall, James. — (4); — (40).
Haller, W. H. *645* (1).
Hanna, Leo A. *404* (6); *1002* (41).
Hanson, Herbert C. — (37); — (41); *A169* (6); *A170* (41f); *C274* (6); *A557* (41).
Hapeman, H. —, —, —, —, — (6).
Harper, Roland M. *135* (6); *1329* (40).
Harris, J. Arthur. *C2827, C21743, C28224, C28632, C28834* (41).
Harrison, B. F. *7541* (6).
Harrison, G. J. & T. H. Kearney. *6573* (21).
Harshberger, John W. — (1); — (6).
Hart, Cecil. — (41g).
Hartman, C. V. *31* (30); *80* (41c, 41f); *324, 379* (8).
Hasse, H. E. —, —, — (20); —, —, — (22).
Hayden, F. V. — (6); —, —, *192* (41).
Hayes, Sutton. *111* (41).
Hayward, Herman E. *113, 174* (41); *203* (6); *228, 453, 580, 751, 791, 2028 p.p., 2471 p.p.* (41).
Hedgecock, George G. *2522* (6).
Heller, A. Arthur. — (4); — (6); *524* (1); *1658* (41); *6026* (41g); *7776* (40); *111212* (41g); *11429* (41a); *11533* (41g); *11773* (41d); *13856* (41f).
Heller, A. A., & E. Gertrude. *3421* (6); *3571* (41).
Henderson, L. F. *5199* (6).
Henshaw, H. W. *191* (22).
Hermann, F. J. *2216* (4).
Herrick, C. Judson & Ruth Herrick. *53* (41).
Heyde, Enrique Th. *549* (15).
Heyde, E. T. & E. Lux. [*3032*] (26); *517* [*3277*] (16); [*4330*] (15).
Hill, E. J. *51* (40).
Hinckley, L. C. *766* (6); *821* (29).
Hinds, Richard Brisley. — (20).
Hinton, G. B. *5027* (11).
Hitchcock, Albert S. — (1); —, —, — (1a); —, —, — (6); —, — (40); *38* (1a); *338* (40); *645a* (1); *1106* (41).
Hitchcock, C. Leo. *2351* (41).
Hoffmann, Ralph. —, — (41a); — (41f).
Holm, Th. — (6); — (41).
Holzinger, John M. — (6).
Hopkins, Milton. *846* (41).
Horsford, F. H. — (40).
Houghton, H. W. *4045* (1).

House, H. D. —, *1359* (1); *16099* (40).

Howell, John Thomas. —, — (41f); *1107* (41g), *1108* (6); *1769, 2478, 3364* (41f); *3399, 4266* (41g); *8137* (41).

Howery, C. E. — (20); — (41g).

Hunt, Clara. — (41g).

Hunt, Edwin. — (4).

Illick, Joseph. —, — (1); — (4); — (6).

Irelean, — (41).

Jack, J. G. — (6).

Jackson, H. H. T. *29* (22); *335* (41).

James, J. F. *1* (20).

Jeffs, Royal Edgar. —, — (1); — (6); — (41).

Jennings, Otto E. —, — (6).

Jennings, Otto E. & Grace K. Jennings. —, —, — (6).

Jenson, M. C. *14* (40); *16* (1).

Jepson, Willis L. — (41g).

Jermy, G. — (29); — (37); — (41); *122* (29); *564, 774* (37).

ex Jermy Herb. *87* (41); *699* (2).

Johnson, A. G. — (40).

Johnson, Frank W. *1098* (4).

Johnson, Harry. *628* (16).

Johnston, E. L. *198, 790* (41).

Johnston, E. L. & G. G. Hedgcock. *790, 802* (41).

Johnston, Ivan M. *60, 3011* (20).

Jones, Marcus E. — (22); — (30); — (41); *122* (39); *1608* (41); *3046* (20); *3090* (41f); *3318* (22); *4321* (30); *5064m* (41f); *5132, 5236e* (41e); *5338g* (41); *5612* (6); *22886, 22887, 23130* (13); *25652* (41); *25653* (29); *25655* (37); *26543* (20), (22); *27099* (9); *78973* (41).

Jones, Wyatt W. — (22); *67* (41).

Jussel, M. S. —, —, *227* (41g).

Juzepczuk, S. *184f* (32); *1473, 1520, 1846* (15).

Kaieser, Margaret. *6* (41).

Kearney, Thomas H., Jr. *143* (1); *639* (6).

Kearney, T. H. & R. H. Peebles. *9248* (22).

Kellerman, W. A. — (41a); *7620* (16).

Kellogg, John H. — (1); — (6); — (6a); — (40); *311* (6); *380* (40a); *384* (40); *1030, 1850, 1851* (1); *1852* (40); *1853* (6); *25843* (41a).

Kellogg, R. S. — (22).

Kennedy, George G. *7* (40).

Kerber, E. *246* (18).

Kirkwood, J. E. *201* (37).

Kitchens, L. W. *48* (41).

Klensmith, E. J. — (20).

Knopf, Ezra C. —, —, *10, 273, 311, 487, 488, 489, 490* (20).

Knowlton, Clarence N. — (1); — (40).

Knowlton, F. H. *170* (41f).

Krause, O. — (6); — (40).

Kreut, A. F. K. *186* (4).

Kusche, J. Aug. —, — (41).

Lake, E. R. — (6).

Lake & Hull, — (6).

Lamb, C. — (4).

Langlois, A. B. —, — (1).

Lansing, O. E., Jr. *158* (40); *586, 868* (41b); *894* (4); *1103* (41b); *1111, 1335* (6); *1702, 1765, 2501, 2711* (41b); *2960, 2990* (40); *3430* (6); *3885* (4).

Larsen, Esther L. *179* (41); *773* (1).

Laybourne, W. A. — (6); *88* (41a).

Lee, Henry. *519* (41).

Leiberg, John B. *893, 1554* (6); *2005* (41g); *3162* (22); *3338* (41f); *5871* (6).

Lemmon, J. G. — (41d); *82* (22).

Lemmon, Mr. & Mrs. J. G. — (16).

LeSueur, Harde. *431* (41d); *770* (37); *M205, M428* (41).

Letterman, George W. —, — (1); —, —, — (2); —, —, — (40); *83* (41a).

ex Letterman Herb. — (40).

Liebmann, F. M. *29, 31, 284* (16); *8664, 14847* (18).

Lighthipe, L. H. — (1).
Lindheimer, F. — (1); —, —, — (29); — (41); *123* (29); *200* (37); *230* (41); *244* (2); *249* (37); *344 (243)*, *345 (243)* (2); *347* (41), *348A*, *348B*, *514* (29); *728* (2); *729*, *730*, *731* (29); *733* (41); *734*, *735* (37).
Little, Elbert L., Jr. — (6); —, — (40); *242* (1); *248*, *473*, *513* (6); *535* (41); *550*, *734* (41a); *736* (6); *3164* (40); *3903* (41), *4057* (22); *4201* (41d); *4286* (6); *4287* (41); *4288* (41d).
Little, Elbert L., Jr. & Charles E. Olmsted. *7* (1); *31* (6); *123* (40); *132* (6); *276* (1).
Lloyd, C. E. *378*, *379* (8).
Lloyd, R. N. — (4).
Lobb, W. *405* (20).
Lodewyks, Maude C. *233* (40).
Lucy, T. F. —, *449*, *1678* (40); *7784* (6); [*7785*] (4).
Lundell, C. L. *5197*, *5309* (37).
Lunell, J. —, —, —, *701* (6).
Lyon, *233* (20).
Macbride, J. Francis. *868* (41).
McCarthy, Geraldus. — (6).
MacDaniels, L. H. *882* (34); *905* (32).
McDonald, F. E. — (40).
McDonald, Julia. —, — (41g).
MacDougal, D. T. *295* (41); *309* (6); *669* (22).
MacFadden, Fay A. *10E* (20).
McGregor, Joe Lee. *43* (6).
McIntosh, A. C. *1042* (41).
McKelvey, Susan Delano. *346* (22).
Mackensen, B. *33* (2).
Mackenzie, Kenneth K. — (1); — (41a).
Macoun, John M. *78*, *4075*, *10075* (41); *73669* (6); *81288* (2).
Maguire, Bassett & R. J. Becraft. *2686* (41).
Marcelline, M. *1854* (41).
Marsh, Ernest G., Jr. *367*, *566* (29); *636* (2); *839* (37).
Martin, Louise. *85* (1).
Mason, H. L. *1970*, *1985* (17); *2034*, *2039* (20a).
Mathias, Mildred. *358* (41); *533* (40).
Mearns, Edgar A. — (22); — (41); *2987*, *3148*, *3200* (22).
Meiere, Mrs. Ernest. — (41e).
Merriam, C. H. — (41e).
Merrill, Elmer D. & E. N. Wilcox. *704* (41).
Merrill, George M. *2* (6); *3* (1); *96* (40).
Merrill, George M. & Wm. A. Hagen. *459* (6).
Metcalfe, O. B. — (6); *25* (41d); *227* (6); *420* (41); *924* (37); *998* (6); *1119* (41).
Mexia, Ynes. *1433* (13); *1640*, *1729* (38); *2529*, *2535* (41, 41f).
Meyer, C. V. *80* (22).
Mill, C. D. — (1a).
Miller, J. H., L. M. Perry, E. S. Boyd & M. C. Myers. *543* (40); *544* (1).
Milligan, J. M. *32* (6).
Millspaugh, C. F. — (4); — (40); *135* (41f); *141*, *4322* (4); *4533*, *4800*, *4915* (20).
Moffatt, W. S. — (41b).
Mohr, Charles. — (40).
Moldenke, Harold N. *367* (1a); *1318* (1); *1321*, *6058* (6).
Montes, M. Narvaez & Antonio E. Salazar. *832* (14).
Moore & Demaree, *4782* (41b).
ex Moore Herb. — (41b).
Moore, John Adam & Julian A. Steyermark. *3085*, *3290* (37); *3326* (41).
Moore, Rufus H. — (6).
Morales, *769* (16).
Morrison, John L. *1027* (41); *1094* (6).
Mueller, C. H. *2109* (29); *8064* (37); *8065* (29); *8066* (41).
Mueller, C. H. & M. T. Mueller. *96* (41); *328* (19).
Mueller, Fred. *1082*, *1281* (16).
Muenscher, W. C. *14821* (5).

Muenscher, W. C. & Bassett Maguire. *2381* (40).
Mulford, A. Isabel. *35, 187, 404* (41); *706* (6); *1045, 1129* (37); *1204* (6).
de Munchhausen, H. A. *331* (1).
Munz, Philip A. & I. M. Johnston. *5327* (22).
Munz, Philip A., I. M. Johnston & R. D. Harwood. *4048* (41f).
Munz, Phillip A. & David Keck. *5004* (22).
Murdoch, John, Jr. *1056* (4); *4090* (41); *4256* (6).
Myers, I. J. *72* (41); *111* (1).
Nash, George V. *1659, 2497* (1a).
Nealley, T. C. — (29); — (41).
Nelson, Aven. —, —, *159, 868, 1477* (41); *2303* (6); *2881, 3063 (322), 3065, 6983* (41); *8456* (6); *9300* (41); *9995* (41f); *10033* (20); *10174* (41); *10903* (40); *11505, 11571* (41).
Nelson, Aven & J. Francis Macbride. *1350* (41).
Nelson, Aven & Elias Nelson. *5964* (41).
Nelson, Aven & Ruth A. Nelson. *545* (22).
Nelson, E. W. *539, 541* (34); *1569, 1828* (28); *2148* (15); *2167* (36); *3451a* (15); *3464* (16); *4166* (13); *4698* (31); *4947* (41f); *6002* (6); *6113, 6422* (37); *7047* (27); *7442* (33).
Nicolas, —, *5053* (18).
Nieuwland, J. A. —, — (1); —, — (4); — (4a); —, —, —, — (6); — (6a); —, — (40); —, — (41b); *5, 5a* (6); *41, 93* (4); *371* (1); *375* (4); *610, 627, 648* (6); *657* (1); *676* (6); *854, 854a* (41b); *872* (1); *1637* (6); *1685* (1); *1819* (5); *2337* (4); *2425* (6); *2426* (5); *2457* (1); *2653* (41b); *9077* (6); *9171a, 9171b, 9466* (4); *9467* (5); *9468* (6); *9497* (4); *10348, 10380* (4a); *10380* (6a); *10416* (6); *10627* (1); *11053* (41b); *11270, 11507* (6); *11624* (7); *11635* (4); *11638* (5), (7); *11651* (1); *11741* (6); *14078* (1).
Nieuwland, J. A. & Th. Just. — (40).
Noell, Julia. *105* (6).
Norton, J. B. — (1); *72* (6); *74, 74a* (40).
Nuttall, L. W. *13* (20); *281* (22).
Nuttall, Thomas. —, — (20).
O'Byrne, S. L. & J. M. Magner. *3414, 3415, 3416, 3417* (41).
Ohlendorf, W. C. — (1).
Ohlweiler, W. W. — (40).
Orcutt, C. R. —, — (20); —, —, —, —, — (22); *26* [*8951*] (41e); *98, 137* (22); *178, 1421* (20); *1423, 1425* (22).
Ortega, Jesús G. *4984, 5385* (14).
Osborn, Ben O. *469 R* (41).
Osterhout, George E. —, *4876* (41).
Otis, I. C. *990* (6).
Overholts, L. O. — (6); — (40).
Oyster, J. H. — (40).
Pace, L. *311* (6).
Palmer, Edward. — (1); — (22); — (37); — (39); *15* (41); *19, 31* (37); *36* (22); *44* (41); *46* (41f); *47* [*5327*] (20); *54* (37); *60* (41f); *61* (25), (41f); *81* (41e); *91, 92, 141* (37); *159* (14); *188 (14255), 189* (29); *190* (31); *193* (37); *206* (31); *214* (36); *313* (41d); *321* (14); *338* (41d); *396* (41); *585* (6); *586* (39a), (41); *590* (41); *730* (17); *735* (20); *785* (41); *1160* [95] (1a); *1907* (13); *9982* [*60, 61*] (41).
Palmer, Ephraim L. & K. M. Wiegand. *765* (6).
Palmer, Ernest J. *15* (1); *16, 75* (6); *706* (41a); *873* (40); *959* (1); *1109* (41a); *1128* (6); *1597* (40); *1805* (41a); *1866* (40), (41a); *1900* (40); *4167* (6); *4384, 4752, 4754* (41a); *5211, 5461* (40); *5463* (41a); *5776, 5821* (6); *5874* (41a); *6011, 6025* (6); *6221*

(1); *6222* (6); *6489* (1); *6526* (2); *7126* (41); *7362* (40); *7823*, *8410* (6); *8411* (40), (41a); *8518*, *8724* (1); *9182* (37); *9191*, *9328* (41); *9847* (29); *9866* (41); *10122* (37); *10769* (2); *10847* (29); *11175*, *11308* (37); *11346*, *11403* (41); *13802* (2); *13808*, *13809* (41); *13896* (41a); *13972* (37); *14243* (6); *14244* (2); *14297* (6); *14543* (2); *15013* (40); *15135* (1); *15184* (40); *15491* (6); *16332* (1); *16619* (40); *17008* (6); *17740*, *18029* (40); *18071*, *18961* (6); *22652* (40); *23044* (6); *23347* (41a); *23355* (6); *23880*, *24359* (40); *24577* (41a); *24582* (40); *25340* (6); *25469*, *25489* (40); *26207* (41a); *26759* (41); *26811* (2); *27040* (41a); *27598* (4); *27599* (6); *27863* (4); *29516* (2); *29767*, *30036*, *30468* (41a); *30882* (2); *30996* (37); *30997* (29); *31485* (1); *31928* (41); *32109* (29); *32127* (41a); *32140* (2); *32865* (40); *33093* (41a); *33552* (37); *34756*, *35491* (40); *35608*, *35643* (41a); *35824* (40); *36630* (6); *36673* (1); *36892* (6); *37014* (41); *37018* (6); *37263* (41); *37617*, *37994* (6); *38032* (41); *39106* (40); *39434* (41); *39496* (41a); *41835* (41); *41836* (6); *42024* (2); *42042* (1).

Palmer, Ernest J. & Julian A. Steyermark. *41099* (40).

Palmer, Wm. & J. H. Riley. *555* (1a).

Pammel, L. H. —, — (1); — (4); —, — (6); — (40); —, *585* (4).

Pammel, L. H. & R. E. Blackwood. *3565* (41); *3661* (6).

Pammel, L. H. & Ferd Reppert. *1217* (40).

Parish, S. B. *2018*, *2202*, *3490*, *3631*, *6802* (22); *6890* (20); *11336* (22); *11698* (41g).

Parks, H. E. & S. T. Parks. *328* (20).

Parry, C. C., & J. G. Lemmon. *42* (22).

Parry, C. C. & Edward Palmer. *125* (25); *126* (37).

Payson, Edwin B. —, *235*, *1012*, *1043*, *1121*, *1121A*, *1155* (41).

Payson, Edwin B. & Lois B. Payson. *3931* (41); *3932* (41e).

Payson, Lois B. *54* (29).

Personett, K. *27* (6).

Phelps, Kate E. — (41).

Pierron, P. E. — (4).

Pittier, H. *1825* (15).

Plank, E. N. — (1); — (6); — (40).

Pollard, Charles Lewis. — (6); *1142* (1a); *1261* (6).

Pollock, W. M. — (1); —, — (6).

Pond, Charles F. —, —, — (17); — (20); —, — (37).

Porter, Thomas C. — (40).

Pratt, Alice D. — (6); — (41).

Price, Sadie F. — (1); — (6); — (40).

Pringle, C. G. — (6); — (30); — (41f); *171* (37); *357* (29); *894* (37); *1774* (9); *2677* (31); *2756* (9); *4815* (18); *5655* (28); *5833* (12); *7725*, *9711* (18); *9712* (9); *11397* (29); *15842* (30).

Purpus, C. A. — (18); — p.p., *62* (41); *1289*, *1289A* (31); *1290* (23); *2279* (16); *2725* (41); *2730*, *2730a*, *2730B* (31); *3166* (35); *4500* (37); *4922* (25); *5819* (18); *5838* (23).

Quaintance, A. L. — (1a).

Ramaley, Francis. *A62* (41).

Redeker, H. *38* (41).

Redfield, John H. — (1); *427* (41); *1159* (1); *1164* (6).

Reed, Fred M. *2238* (20).

Rehn, J. A. G. & H. L. Viereck. — (30); — (41).

Reko, B. P. *4021* (12a); *4600* (9); *5157* (37).

Reverchon, J. —, — (2); —, —, —

(37); — (40); —, —, —, — (41); *7* (40); *20, 25* (29); *149* (40); *152, 153* (2); *693* [*156*] (37); *1932, 1932B* (2); *1933* (1); *3058* (41d); *3812* (29); *3813* (41); [*444*] (2); [*449*] (37), (41).
ex Reverchon Herb. — (2).
Reynolds, Mrs. L. R. — (41f).
Riehl, N. *156* (1).
Roadhouse, J. E. — (20).
Robbins, W. W. *1583* (41).
Rojas, Ruben Torres. *203* (15).
Rolfs, P. H. *544, 654* (1a).
Rolland-Germain, F. *13022* (40).
Rose, J. N. *3093* (9); *13100* (14); *16049* (17); *16134* (20a); *16212* (17).
Rose, J. N. & Walter Hough. *4721* (18).
Rose, J. N. & Joseph H. Painter. *7608* (9).
Rose, J. N. & J. S. Rose. *11435* (18).
Rothrock, J. T. — (30); *203* (41).
Rowlee, W. W. — (4).
von Rozynski, H. W. *244, 245* (31); *505* (25); *603, 703* (31); *784* (16).
Ruddock, George T. — (22).
Rugel, F. — (40).
Rusby, Henry H. — (1); *70* (37); *71* (41d); *72* (41).
Russell, Colton. — (1); — (40).
Ruth, Albert. — (2); —, —, *3, 31* (40); *143* (6); *357* (41); *778* (2); *835* (6).
Rydberg, Per Axel. *1443* (6).
Rydberg, Per Axel & E. C. Carlton. *7026* (41).
Rydberg, Per Axel & A. O. Garrett. *9449* (41).
Rydberg, Per Axel & Ralph Imler. *318* (40); *870* (41).
Rydberg, Per Axel & F. K. Vreeland. *5909* (41).
Safford, William E. *1458a* (9).
Salazar, F. — (2); — (16); — (31); *97* (16).
Salmon, S. C. — (6).
Sandberg, J. H. —, — (4); — (6); — (6b); *1008* (41).
Sargent, C. S., B. Thayer & B. H. Smith. — (1a).
Sartwell, H. P. — (6); — (40).
Savage, T. E., J. E. Cameron & F. E. Lenocker. — (6).
Savage & Stull, — (40).
Schaffner, J. G. *95, 908* (25).
Schaffner, J. G. & Wilhelm Schaffner. *455* (25).
Schedin, L. M. & N. T. Schedin. — (41).
Schiede, G. *715* (16).
Schmoll, Hazel M. *1215, 1377, 1643* (41).
Schoenfeldt, L. *3234, 3264, 3430* (22).
Schott, A. — (29).
von Schrenk, Hermann. — (1); —, — (1a); — (29); — (40); *54* (37).
Schriver, Howard. — (40).
Schuette, J. H. —, — (4).
Schulz, Ellen D. *2350* (2).
Sears, Paul Bigelow. *1378* (41a).
Seler, Caec. & Ed. *1472* (28); *1487* (18); *1729* (11); *3287* (16a); *3296* (16); *4389* (12).
Sessé, Mociño, Castillo & Maldonado. *854* (26); *855, 4939* (11); *4941* (26); *4942* (31).
Setchell, W. A. — (20).
Seymour, F. C. *489* (6); *607* (1).
Shafer, J. A. & Bro. Leon. *13671* (1a).
Shannon, James I. *222a* (40).
Shear, C. L. *104* (41a).
Shellon, G. T. *57* (41).
Sherff, Earl E. — (4a); — (6b); — (41b); *79* (40).
Shimek, B. —, — (1); — (4); —, —, —, —, —, — (6); —, —, — (40); —, — (41); —, — (41a).
Short, C. W. —, — (40).
Silvio, Lelia & C. Conzatti. *4100* (18).
Simpson, J. H. *51* (1a).

Skehan, J. — (1).

Small, John Kunkel. — (1); — (4); —, —, —, — (6); —, —, —, — (40).

Small, John Kunkel & A. A. Heller. — (40); *339* (1).

Smith, Charles L. *739, 839* (18); *840* (12a); *804a* (18); *840b* (12a); *841* (11).

Smith, Ernest C. — (1); *577* (6).

Smith, Huron H. *45* (6); *1376* (4); *2102* (1a); *2396, 2627* (6); *4582* (20); *4812* (22); *4903* (20); *4934* (41d); *5090, 5116, 5330* (20); *5469* (41f), (41g); *5479* (22); *5774* (1).

Smith, Lucius C. *321* (12), (12a); *464* (24).

Smith, L. E. — (41d).

Solís, Octavio. *3* (17).

Souviron, M. J. & C. C. Erlandson. *61* (32).

Spencer, Mary F. *137, 287* (22).

Standley, Paul C. — (41d); *39* (37); *21530* (15), (16); *35476, 35833* (16); *56098* (16a).

Stark, B. D. — (41f).

Steele, Mr. & Mrs. E. S. —, — (5); *5* (4); *177* (6).

Stephens, Bettie. *FC15* (6).

Stevens, G. W. *268* (41); *714* (6); *766* (41); *1998* (1).

Steward, G. L. —(6).

Stewart, Alban. *68* (17).

Steyermark, Julian A. *1104* (40); *1105, 1139* (6); *7797, 7798, 7799, 8396* (41a); *13006* (40); *13117, 13176, 13396, 13478* (41a); *13551* (6); *13591* (41a); *13970* (40); *14586, 14773, 15979, 16347* (41a).

Stone, Witmer. *648* (41f).

Stratton, Robert. *6* (41); *169* (6).

Studhalter, R. A. *1041* (29).

Sturtevant, E. L. — (1); —, — (6).

Sudworth, George B. —, — (20).

Taylor, Mary. *71* (25); *165* (37).

Thompson, C. H. *120* (41).

Thone, Frank H. *185* (6); *302* (4).

Thornber, J. J. *544* (37); *551* (41).

Thurber, George. — (37); *73* (29); *562* (20).

Tidestrom, Ivar. — (1); — (40); *9607* (41f).

Tonduz, Adolpho I. *713* (10); *9828* [*6999*] (15).

Toumey, J. W. — (22); *16* (30).

Townsend, C. H. T. & C. M. Barber. *154* (6); *191* (41c).

Tracy, S. M. — (6); *7012* (1).

Tracy, S. M. & F. S. Earle. *112* (37); *258* (41).

Tracy & Lloyd, *274* (1a).

Trask, Blanche. —, —, —, —, —, —, —, —, —, — *p.p.* (20); —, —, —, —, —, —, —, —, —, —, — (22); —, — (22a); *39* (22); *53, 54, 91* (20); *92* (22); *95, 103, 142, 248, 249* (20); *413, 414, 415* (22); *417, 418* (20); *435* (22).

Trelease, William. — (1); — (6); — (40); — (41); *42* (37); *248* (1); *249, 250, 251, 252, 253, 254, 255, 256* (40); *968* (41a); *4391* (41).

Trelease, William & de Alton Saunders. *4390* (41).

von Tuerckheim, H. *1153, 1432, 3913* (32); *II 1506* (15), [*340*] (16).

Tweedy, Frank. *3533* (41); *4948* (41).

Uline, Edwin Burton. — (4).

Umbach, L. M. —, — (4); —, — (41b).

Underwood, J. K. *774* (40).

Valerio. Manuel. *1038* (15).

Van Dyke, Mrs. E. C. — (41g).

van Vleet, A. H. *54* (6).

Vasey, G. R. — (6); — (37); —, — (41).

ex Vasey Herb. — (40).

Veatch, John A. — (17).

Vincent, Helen N. *67* (41).

Visher, S. S. *2074* (41); *2277* (6); *2558, 3349* (41); *4134* (6).

Voth, H. R. *70* (41f).

Waite, M. B. — (40).

Walker, Ernest P. *122*, *414* (41).
Walther, Eric. — (41g).
Ward, Lester F. *6* (41).
Warner, S. R. — (1); — (6); — (40).
Warner, W. G. *4* (1).
Waugh, F. A. —, — (1); *103* (6); *131* (41); *133* (1).
Weatherby, C. A., L. B. Smith, S. K. Harris & G. B. Rossbach. *2783* (1).
Webber, H. J. — (6).
Whaley, Celeste. *111* (1).
White, Mark. — (41).
White, Paul J. — (41).
White, T. F. *16759* (41b).
White, W. E. — (41).
Whited, Kirk. *945* (41g); *1059* (6).
Whitford, H. M. *62* (6).
Wibbe, J. Herman. — (4).
Wiegand, K. M. — (6); *10243* (40).
Wiegand, M. C. & G. B. Upton. — (41).
Wiggins, Ira L. *3285* (20).
Wiggins, I. L. & D. K. Gillespie. *3905* (20); *4052* (41f).
Wilcox, Timothy E. *378* (41c).
Williams, Louis O. *457* (41).
Williams, T. A. —, *90* (41).
Williams & Wilcox, — (41).
Willits, Vic. *440* (41).
Wilson, Norman C. — (41); — (41f).
Wilson, Percy. — (4); — (6); — (6).
Wilson, Percy & E. J. Alexander. — (6).
Wislizenus, Frederick. *56* (6); *57* (1); *59* (40); *359* (37); *474* (41).
Wolf, Carl B. *2353*, *2465* (41f); *2481* (22); *2507* (41f); *2575* (41c); *2805* (41); [*1857*] (22).
Woodcock, F. G. — (22).
Woodson, Robert E., Jr. *377* (40); *563* (6); *742* (1); *1879* (41).
Woodson, Robert E., Jr. & E. Anderson. *1547* (40).
Wooton, E. O. —, — (30); —, —, — (41); — (41d); *48* (41); *68* (37); *581* (6); *584* (41d).
Woronow, G. — (39); *2919* (38).
Wright, Charles. *83* (29); *917* (41); *1341* (37); *1342* (41d); *2290* (1a).
Wright, Will S. *33* (20).
Wriglet, Elizabeth. — (41d).
Wynd, F. Lyle & C. H. Mueller. *48* (37); *169* (19); *396* (29); *416* (2); *613* (41).
Young, M. S. — (6); — (37); — (41).
Yuncker, T. G., R. F. Dawson & H. R. House. *6344* (15).
Zobel, Henrietta L. — (41).
Zumbro, C. A. *387* (20).

TOXICODENDRON

Abbot, *246* (3d).
Abrams, LeRoy. *9900* (2).
Adams, J. W. *236* (3).
Anderson, A. P. — (5).
Anderson, F. W. — (3).
Anderson, J. P. —, — (3).
Arsène, G. — (3); *10* (2); *2509*, *2763*, *3011* (3).
Ashe, W. W. — (5).
Austin, Mrs. R. M. —, —, —, *97*, *749* (2).
Baker, C. F. *547* (2).
Baker, H. P. — (3).
Baker, M. S. & Frank Nutting. — (2).
Ball, Carleton R. *429* (3).
Ball, J. — (2).
Bardell, E. M. — (2).
Barkley, Fred A. —, — (3).
Barkley, Fred A. & Ben O. Osborn. *1405* (1).
Bassler, Thomas. — (3).
Batchelder, Charles Foster. — (5).
Beattie, Frederick S. — (3).
Bebb, Robert. *319* (5).
Bell, W. B. *104* (3).
Bergman, H. F. *1895* (3).
Berkley, Earl E. *1639* (5).
Berlandier, J. L. *625* (1); *2475* (3).
ex Bernhardi Herb. — (1).

Bigelow, J. M. — (3b).
ex Biltmore Herb. *1377b* (5).
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Explanation of Plate

PLATE 10

Flowers representative of the Rhus-complex. × 6.

Fig. a. *Rhus trilobata* var. *serotina* (Greene) Barkley *(Moore & Demaree 4782)*. The lower right bract is depicted as torn to show the small lateral bracteoles.

Fig. b. *Rhus terebinthifolia* Schlecht. & Cham. *(Türckheim 1506)*.

Fig. c. *Actinocheita filicina* (DC.) Barkl. *(Pringle 9164)*.

Fig. d. *Rhus Andrieuxii* Engler *(Purpus 2730A)*.

Fig. e. *Rhus integrifolia* (Nutt.) Benth. & Hook. *(Baker 818)*.

Fig. f. *Cotinus americanus* Nutt. *(Eggert*, May 8, 1898). Note the densely pubescent pedicels of the abortive flowers.

Fig. g. *Rhus microphylla* Engelm. *(Eggert*, May 9, 1901). The bract, one bracteole, and the flower have been removed at the lower left to show the character of the pedicel.

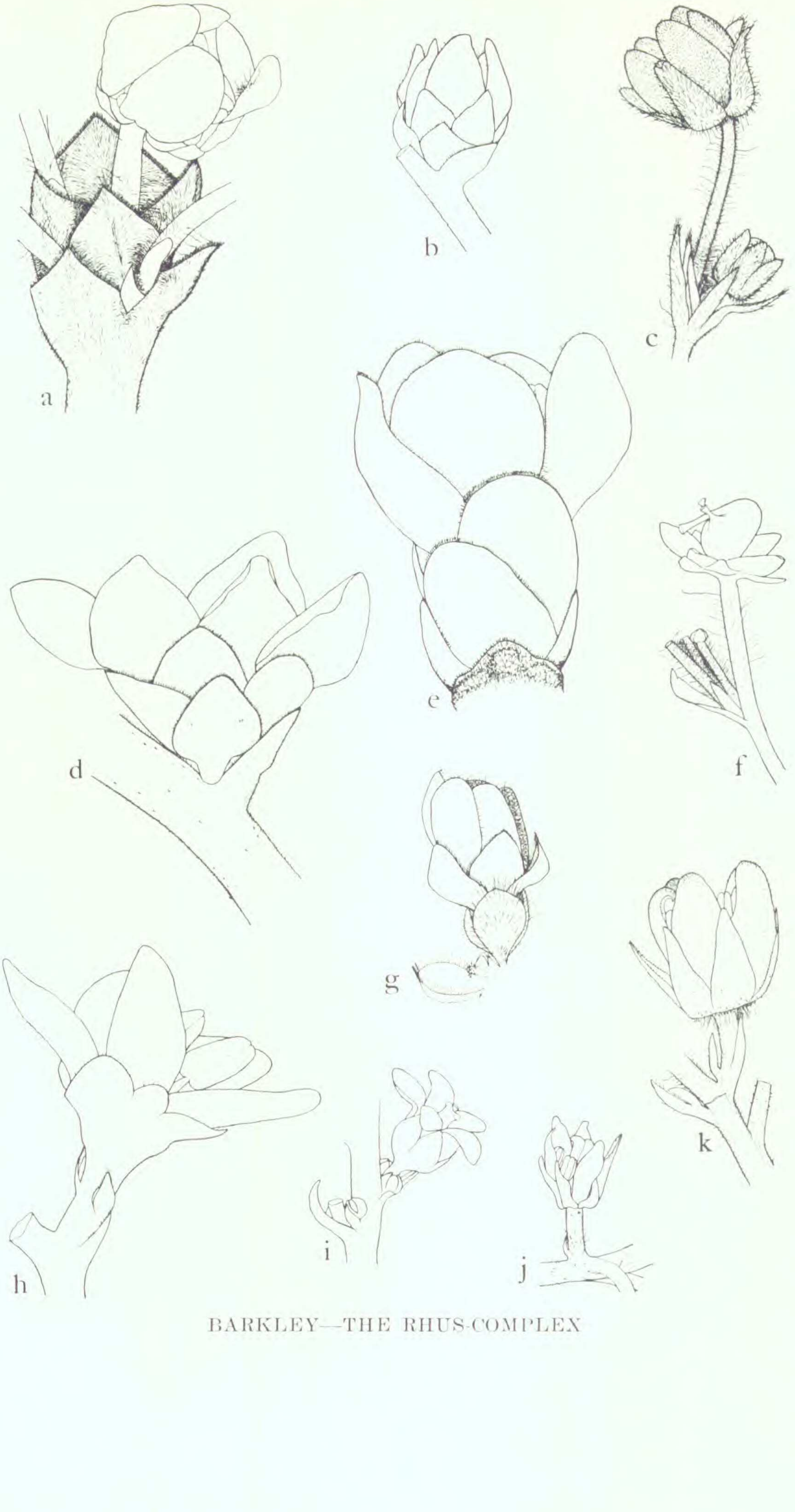
Fig. h. *Metopium toxiferum* (L.) Krug & Urb. *(Duckett*, April 30, 1930).

Fig. i. *Malosma laurina* (Nutt.) Nutt. ex Engler *(Abrams 2639)*.

Fig. j. *Toxicodendron Vernix* (L.) Kuntze *(Short*, Ky., 1840).

Fig. k. *Rhus glabra* L. *(Churchill*, July 30, 1882).

PLATE 10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BARKLEY—THE RHUS-COMPLEX

Explanation of Plate

PLATE 11

Longitudinal sections through flowers representative of the Rhus-complex. × 6.

Fig. a. *Rhus microphylla* Engelm. (———. April 20, 1902, plains west of Pecos).

Fig. b. *Rhus Barclayi* (Hemsl.) Standl. *(Mexia 1433).*

Fig. c. *Actinocheita filicina* (DC.) Barkl. *(Purpus 1236).*

Fig. d. *Rhus aromatica* Ait. (———, May 25, 1929, Glenmont, N. Y.).

Fig. e. *Rhus ovata* Wats. *(A. & R. Nelson,* May 8, 1933).

Fig. f. *Cotinus americanus* Nutt. *(Eggert,* May 8, 1898).

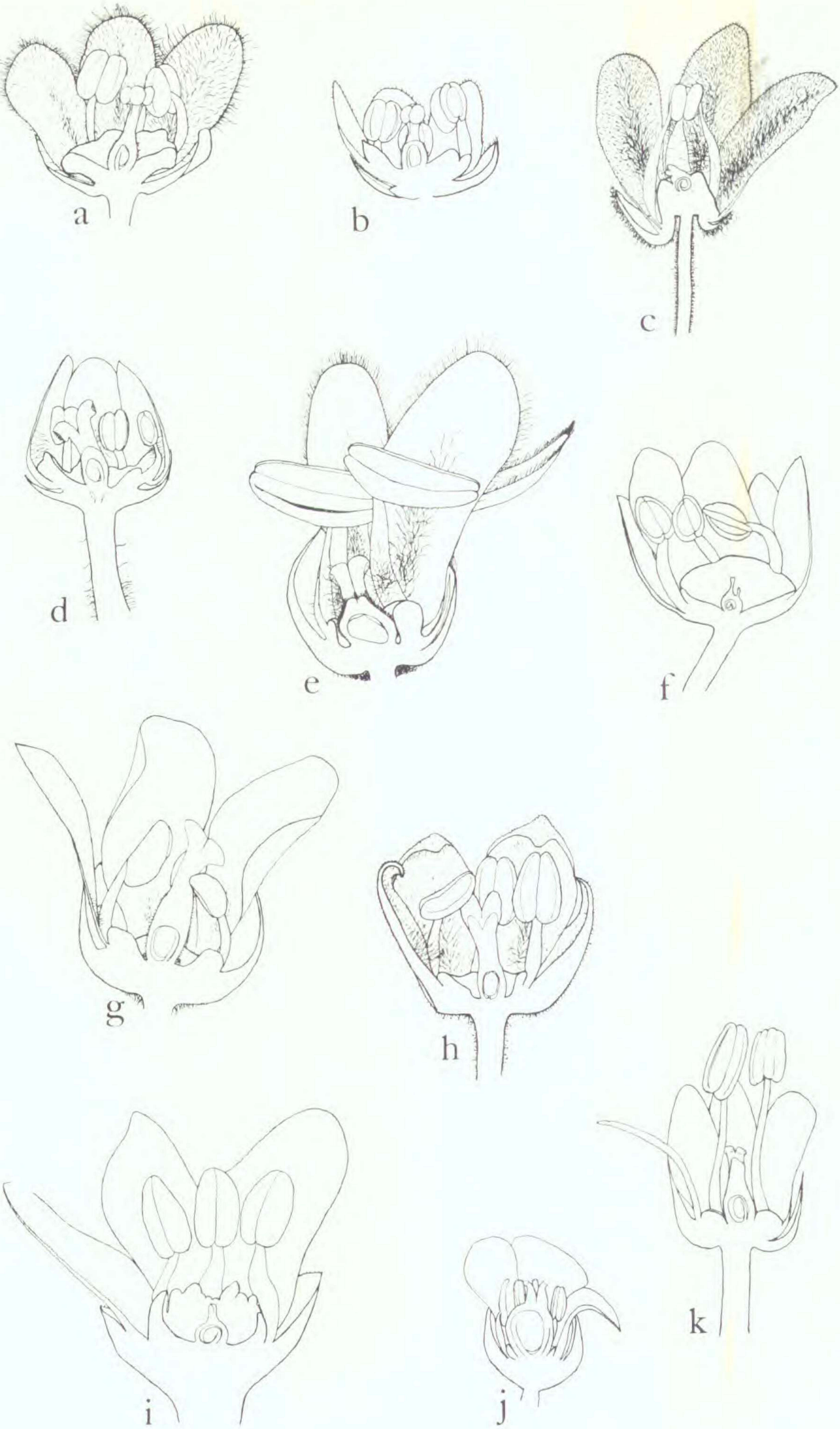
Fig. g. *Rhus virens* Lindh. *(Redfield,* Oct. 5–10, 1880).

Fig. h. *Rhus glabra* L. *(Churchill,* July 30, 1882).

Fig. i. *Metopium toxiferum* (L.) Krug & Urb. *(Moldenke 778a).*

Fig. j. *Malosma laurina* (Nutt.) Nutt. ex Engler *(Elmer 4015).*

Fig. k. *Toxicodendron Vernix* (L.) Kuntze *(Tracy 8742).*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BARKLEY—THE RHUS-COMPLEX

EXPLANATION OF PLATE

PLATE 12

Flower structure in the Rhus-complex. × 4.5. In each flower the outline of the disk and lateral views of the pistil, stamen, sepal, and petal are depicted, the upper figures representing the parts of the pistillate flower, the lower those of the staminate flower.

Fig. a. *Rhus microphylla* Engelm. *(Eggert,* May 9, 1901, and ———, April 20, 1902.

Fig. b. *Rhus terebinthifolia* Schlecht. & Cham. *(Türckheim 1506,* and *Purpus 2279).*

Fig. c. *Rhus trilobata* var. *serotina* (Greene) Barkley *(Norris,* June 21, 1880, and *Moore & Demaree 4782).*

Fig. d. *Rhus Andrieuxii* Engler *(Palmer 190* and *Purpus 2730A).*

Fig. e. *Rhus integrifolia* (Nutt.) Benth. & Hook. *(Howery,* April 1, 1912, and *Baker 818).*

Fig. f. *Cotinus americanus* Nutt. *(Eggert,* May 8, 1898).

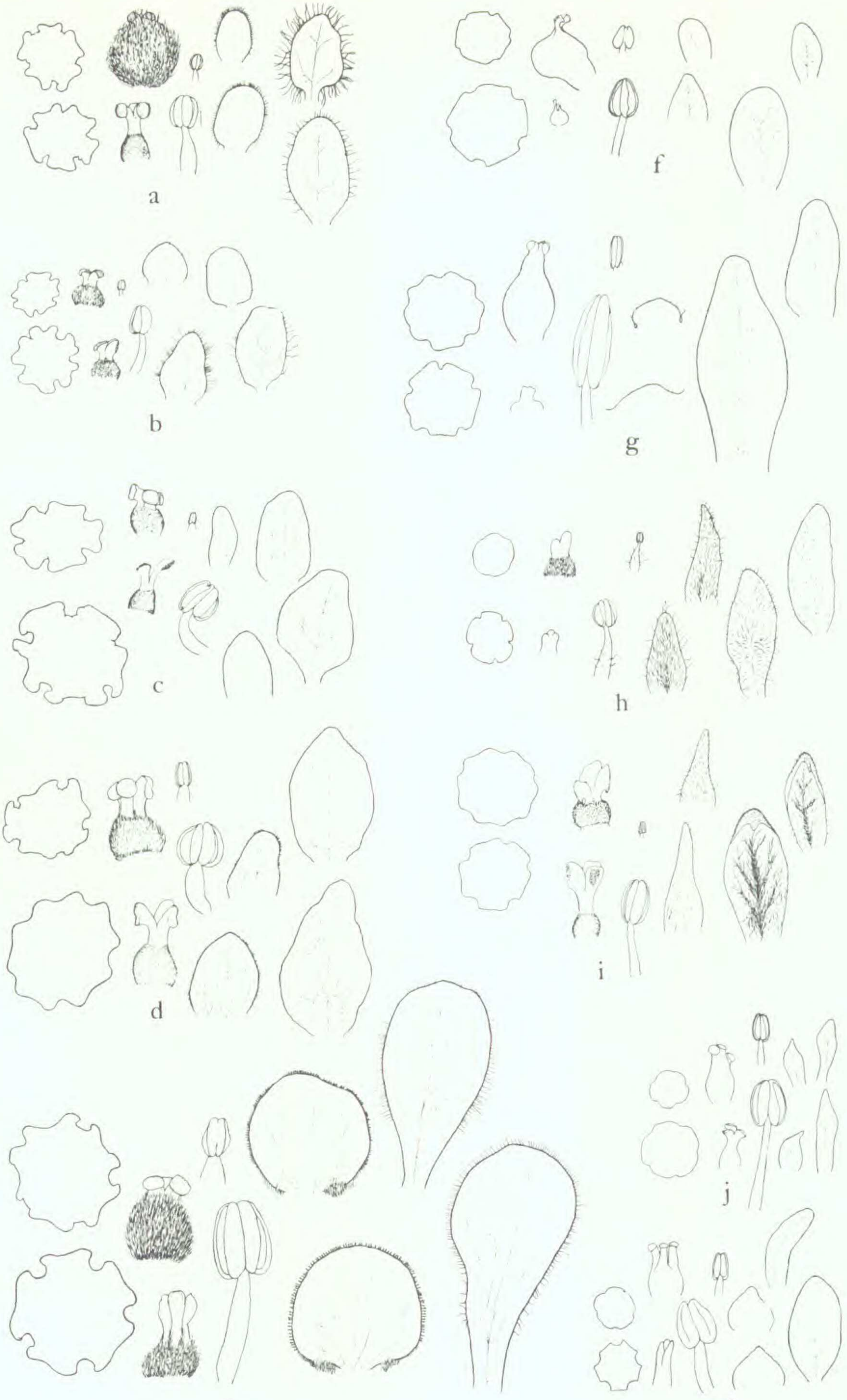
Fig. g. *Metopium toxiferum* (L.) Krug & Urb. *(Curtiss 448* and *Moldenke 778a).*

Fig. h. *Actinocheita filicina* (DC.) Barkl. *(Pringle 4752* and *Purpus 1236).*

Fig. i. *Rhus glabra* L. *(Tracy,* May 20, 1876, and *Churchill,* July 30, 1882).

Fig. j. *Toxicodendron Vernix* (L.) Kuntze *(Short,* Ky., 1840, and *Tracy 8742).*

Fig. k. *Malosma laurina* (Nutt.) Nutt. ex Engler *(Elmer 4015* and *Engelmann,* Sept. 16, 1880).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BARKLEY—THE RHUS-COMPLEX

Explanation of Plate

PLATE 13

Fig. a. A portion of a leaf of *Rhus trilobata* var. *serotina* showing unbranched pubescence of a type common in the Rhus-complex *(Steyermark 13006).* × 8.

Fig. b. Stem structure of *Rhus.* Cross-section of a one-year-old stem of *Rhus aromatica* (left) and of *Rhus glabra* (right). Note the comparative size of the pith.

Fig. c. Pubescence from the epicarp of the fruit of *Rhus glabra (Palmer 14243).* × 28.

Fig. d. Pubescence from the epicarp of the fruit of *Rhus glabra* var. *borealis (Sandberg,* Aug. 1891). × 28.

Fig. e. A portion of the margin of a sepal of *Rhus Muelleri* showing the character of the glandular hairs. × 28.

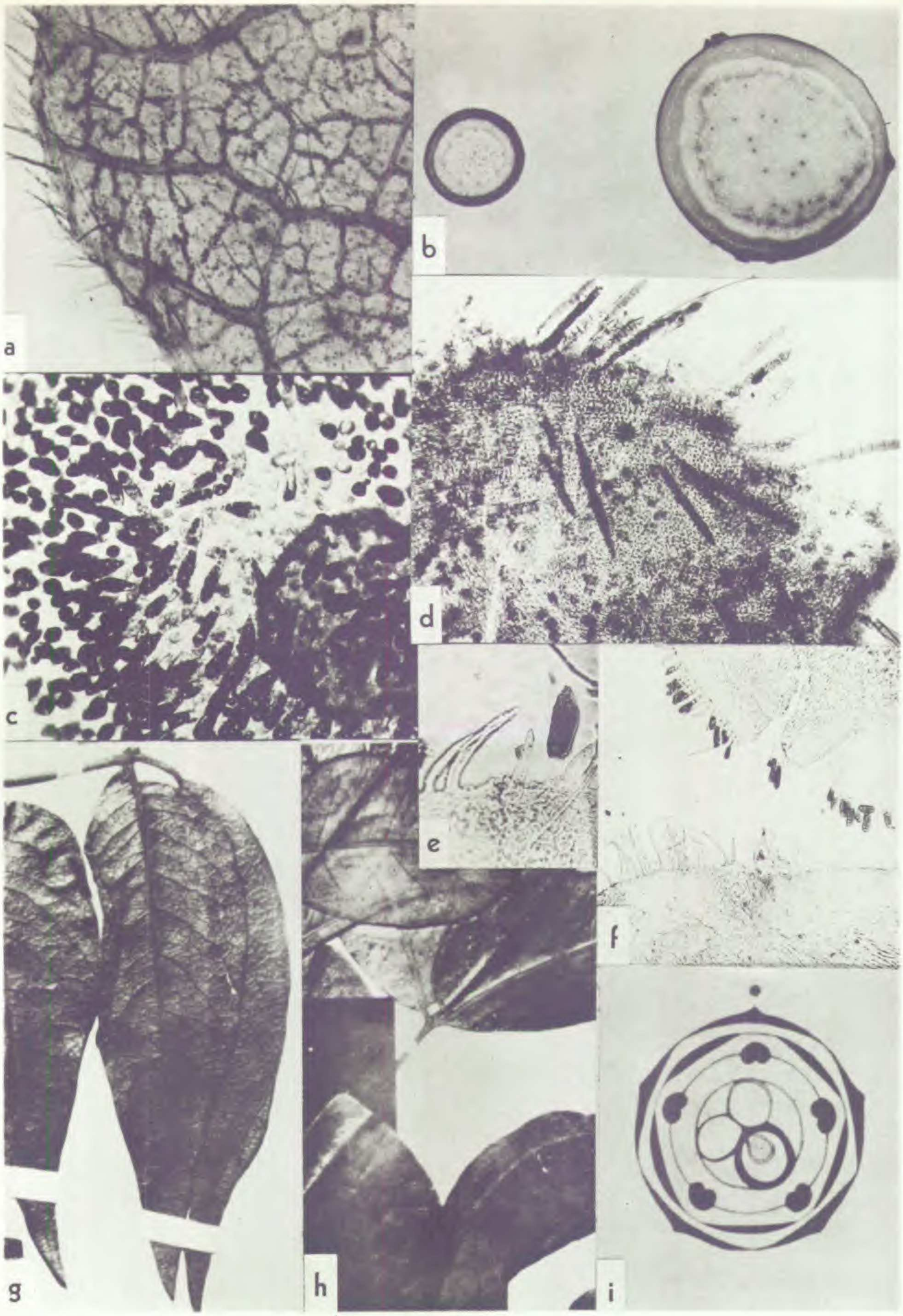
Fig. f. Portions of the petal (below) and sepal (above) of *Rhus Muelleri,* taken from the type specimen. Note the mixed simple and glandular ciliation on the sepal. × 7.

Fig. g. Leaflets of *Rhus oaxacana (Nelson 1569).* The small veins of some species are quite conspicuous in herbarium material.

Fig. h. Leaflets of *Rhus virens (Wynd & Mueller 396).* The smaller veins of many species are quite inconspicuous.

Fig. i. Floral diagram of *Rhus* (after Goebel).

(Photographs by the author.)



BARKLEY—THE RHUS-COMPLEX

EXPLANATION OF PLATE

PLATE 14

Fruits and seeds of *Rhus* and its immediate allies, × 4.1:

Fig. a. Fruit and seed of *Actinocheita filicina (Seler 1419).* Note the long pilosity of the fruit-coat and the rugosity of the seed.

Fig. b. *Cotinus americanus (Palmer 27085).* Note the veiny fruit, the lateral, separate styles, and the long pedicel.

Fig. c. *Metopium toxiferum (Valeur 698).*

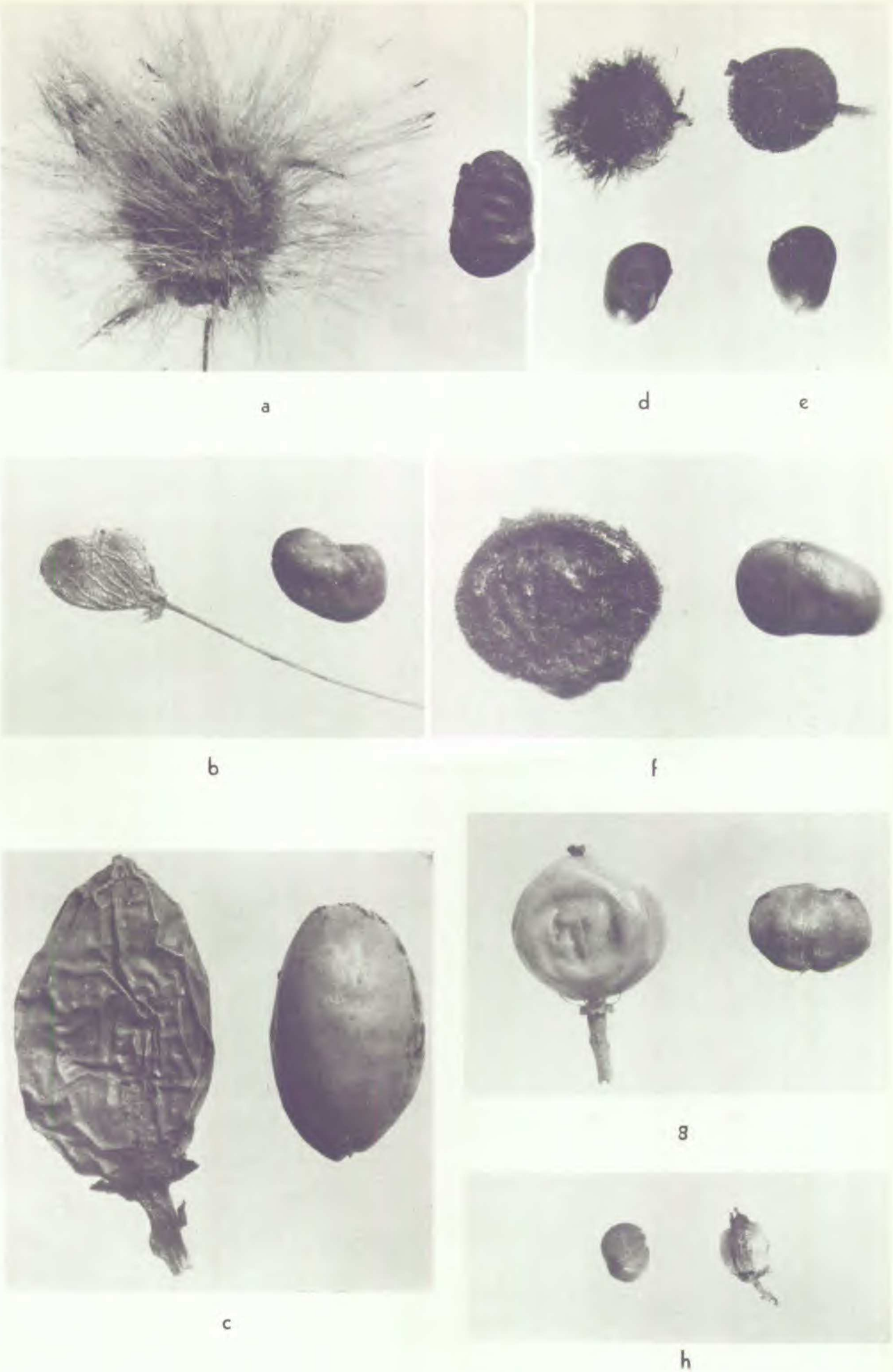
Figs. d and e. *Rhus typhina (Wilson 142)* and *Rhus glabra (Palmer 4167).* Note the pilosity of the former, and the short pubescence of the latter (see also pl. 13, fig. c).

Fig. f. *Rhus Andrieuxii (Rozynski 703).* The pubescence of the fruit-coat is composed of long, simple, non-glandular, and short, club-shaped, glandular hairs.

Fig. g. *Toxicodendron Vernix (Batchelder,* Sept. 14, 1927).

Fig. h. *Malosma laurina (Eby,* Dec. 1900). Note the separate styles and the raised line down the side.

(Photographs by Woodson and Barkley.)



BARKLEY—THE RHUS-COMPLEX

Explanation of Plate

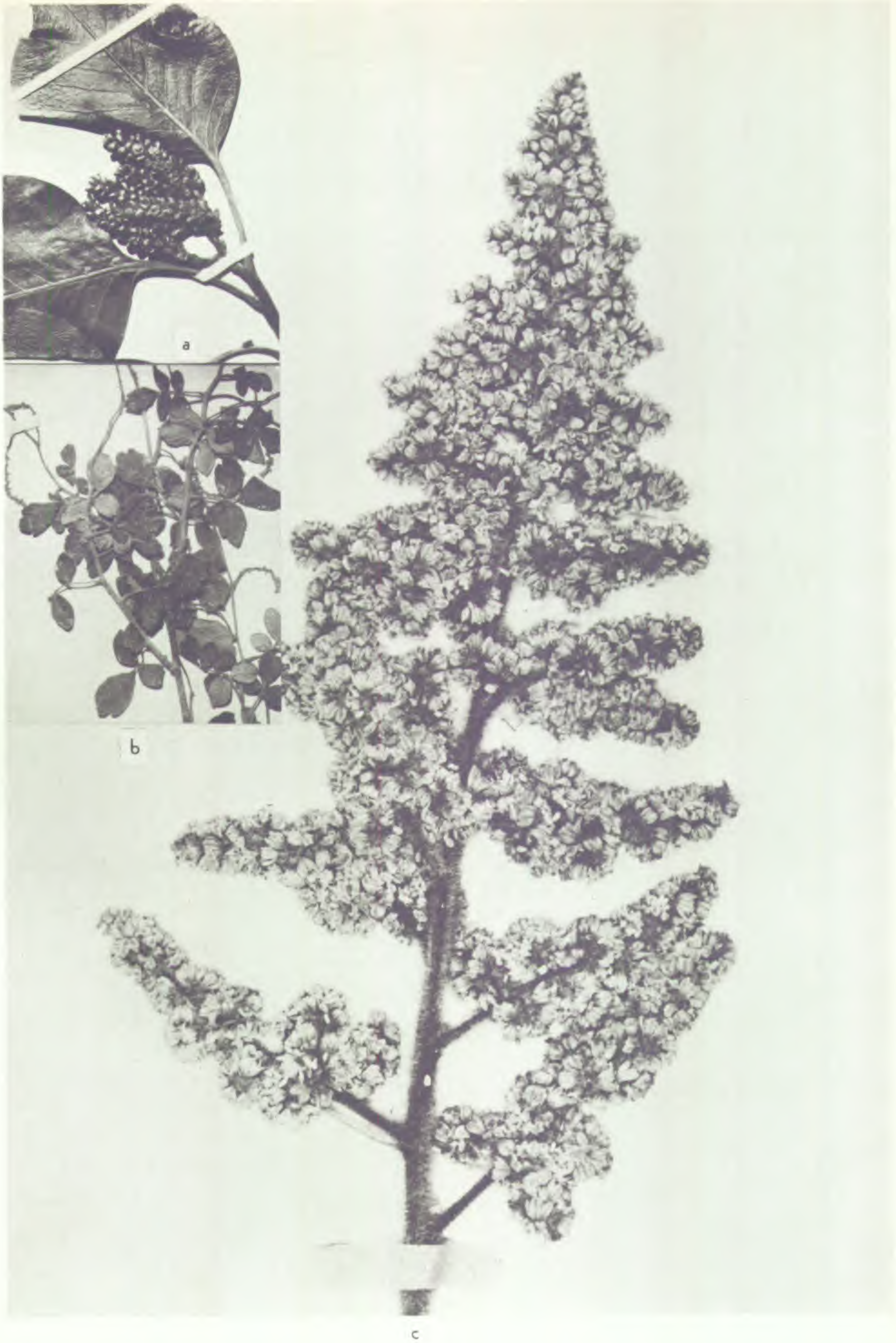
PLATE 15

Inflorescence structure in *Rhus:*

Fig. a. ***Rhus ovata*** × .63 *(Braunton 1026).*

Fig. b. *Rhus Arsenei* × .63 *(Arsène & Amable 1566).*

Fig. c. *Rhus typhina* × .95 *(Jos. Illick,* Mt. Alton, Pa., 1909). Note the contrast between the compound spikes of *Rhus ovata* and *R. Arsenei* and the thyrsus of *R. typhina.*



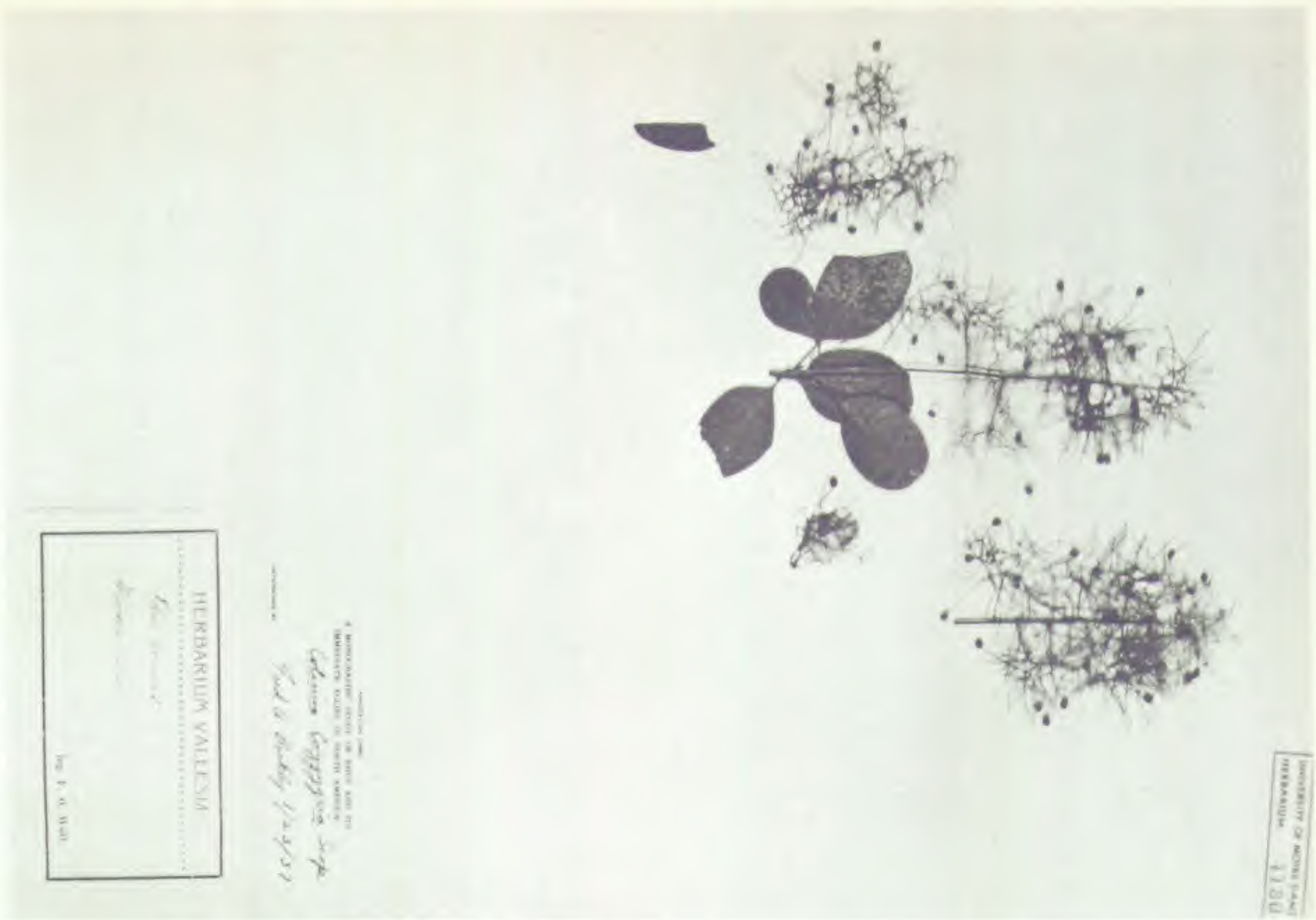
BARKLEY—THE RHUS-COMPLEX

Explanation of Plate

PLATE 16

Fig. 1. *Cotinus Coggygria* Scop.

Fig. 2. *Cotinus americanus* Nutt. The leaves of this species are typically larger than in the European species, more decurrent on the petiole and the leaf margin is not noticeably thickened; also the inflorescence is less compact. Note the difference in aspect between the inflorescence at anthesis and in fruit.


HERBARIUM VALLESIM
UNIVERSITY OF NOTRE DAME
HERBARIUM

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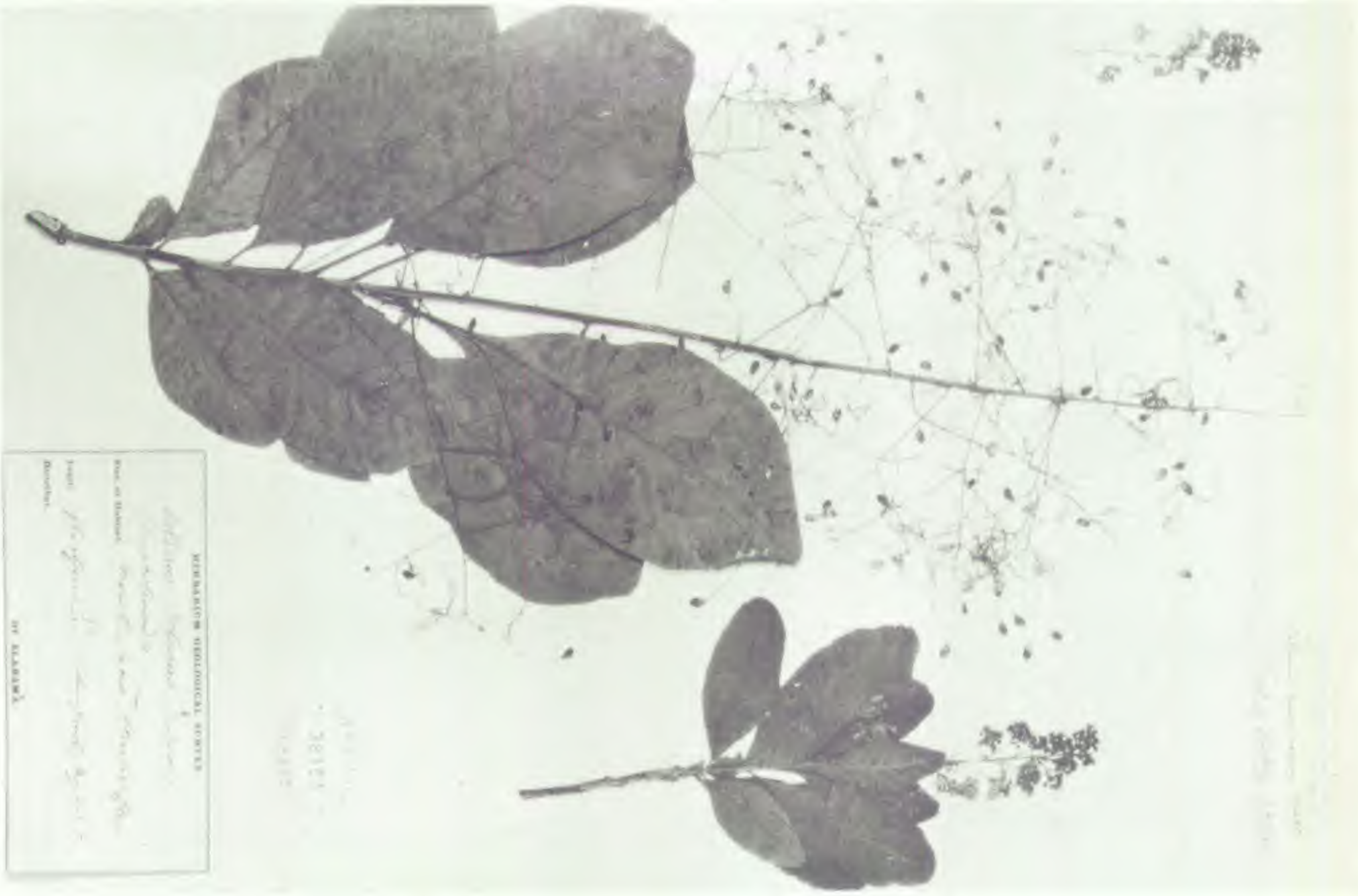

HERBARIUM GEOLOGICAL SURVEY
OF ALABAMA

2

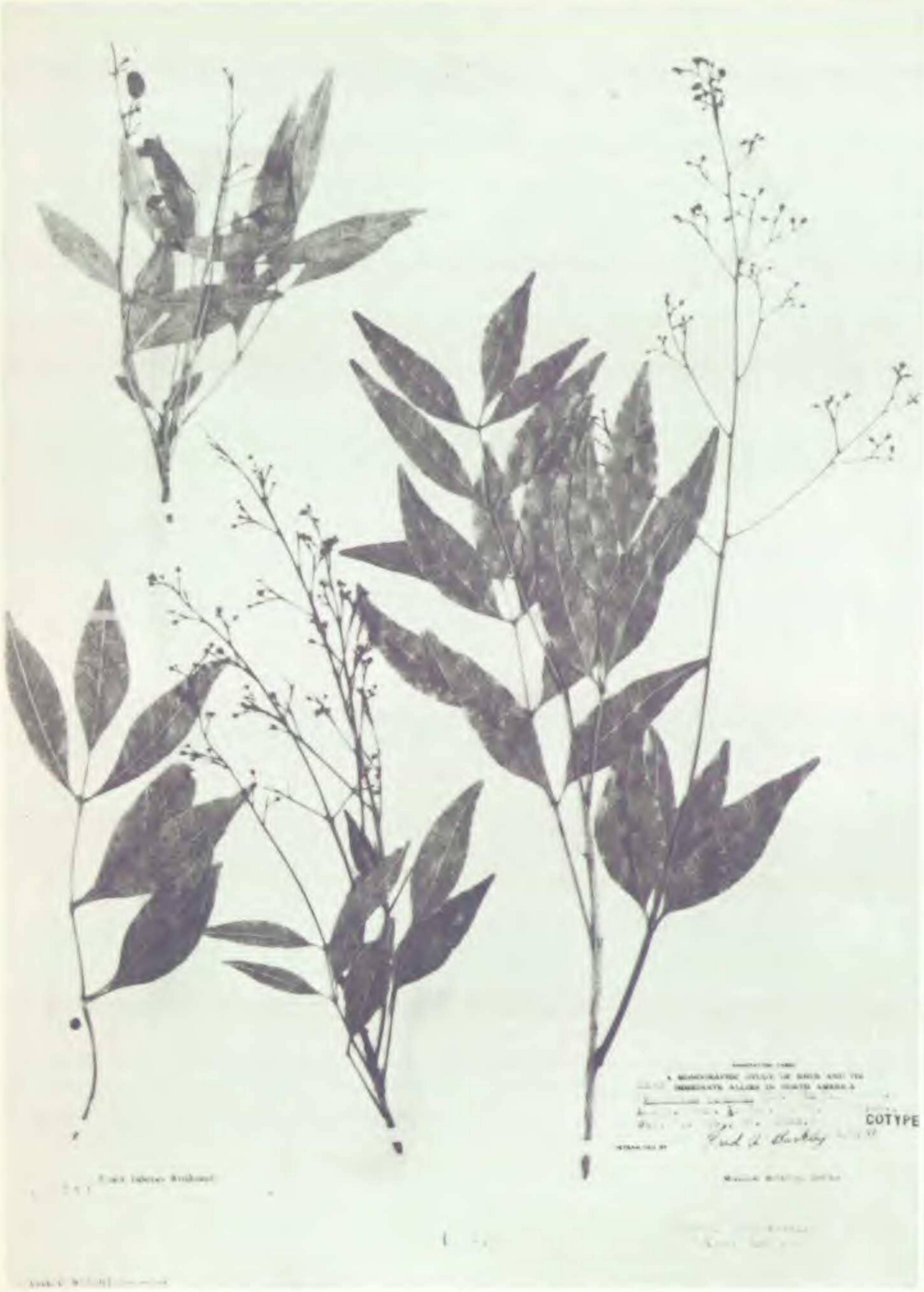
BARKLEY—THE RHUS-COMPLEX

Explanation of Plate

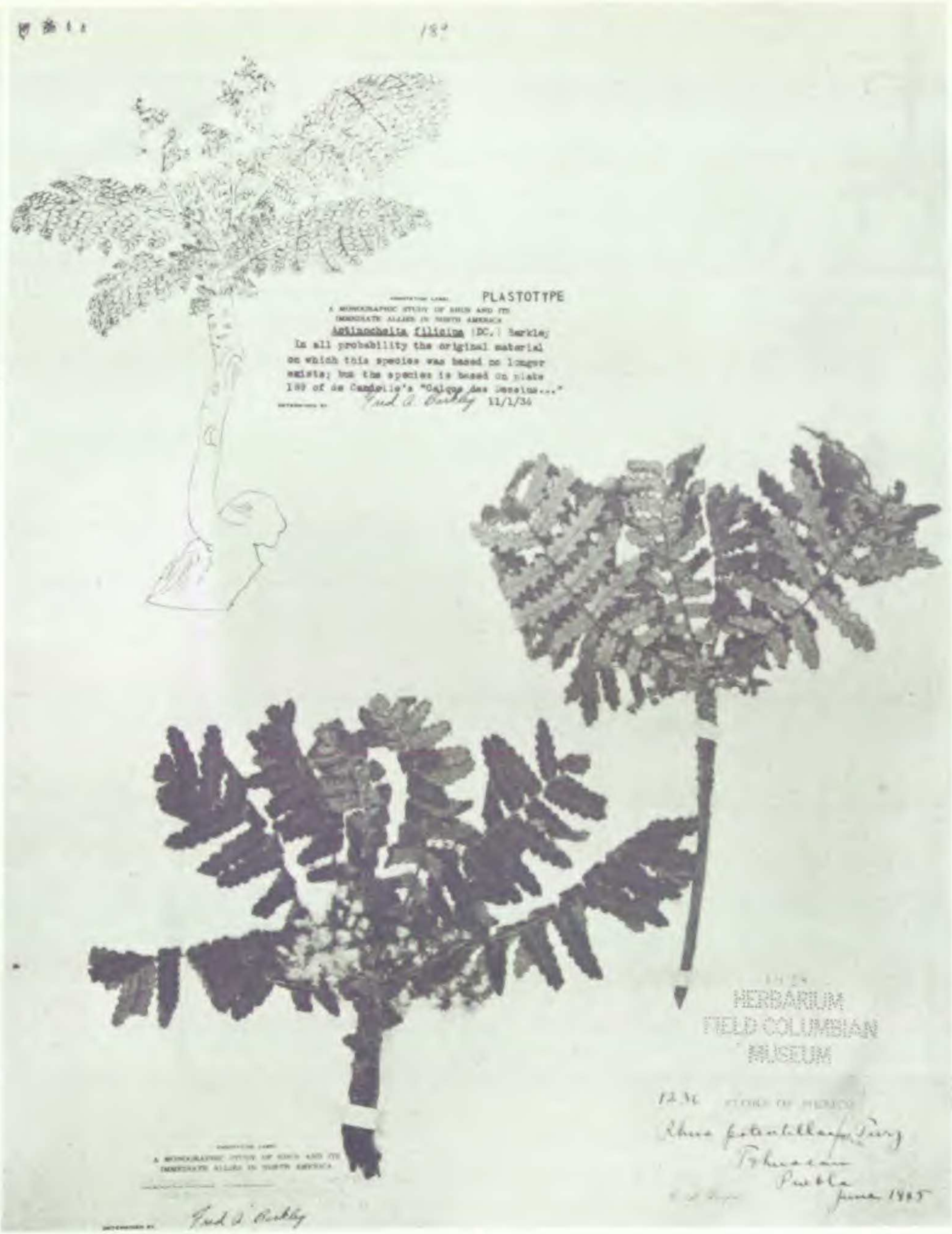
PLATE 17

Fig. 1. *Metopium venosum* (Griseb.) Engler. From the type collection, *C. Wright,* May and October, 1860–1864, eastern Cuba.

Fig. 2. *Actinocheita filicina* (DC.) Barkley. From specimen, *Purpus 1236,* in Field Museum Herbarium. The insert at the upper left is a reproduction of *plate 189* from de Candolle's 'Calque des Dessins.'


COTYPE
Fred A. Barkley

1


18?
PLASTOTYPE
Actinocheita filicina (DC.) Barkley
In all probability the original material
on which this species was based no longer
exists; but the species is based on plate
189 of de Candolle's "Calque des Dessins..."
Fred A. Barkley 11/1/34
HERBARIUM
FIELD COLUMBIAN
MUSEUM
1236
Rhus potentillaefolia Turcz
Tehuacan
Puebla
June 1905
Fred A. Barkley

2

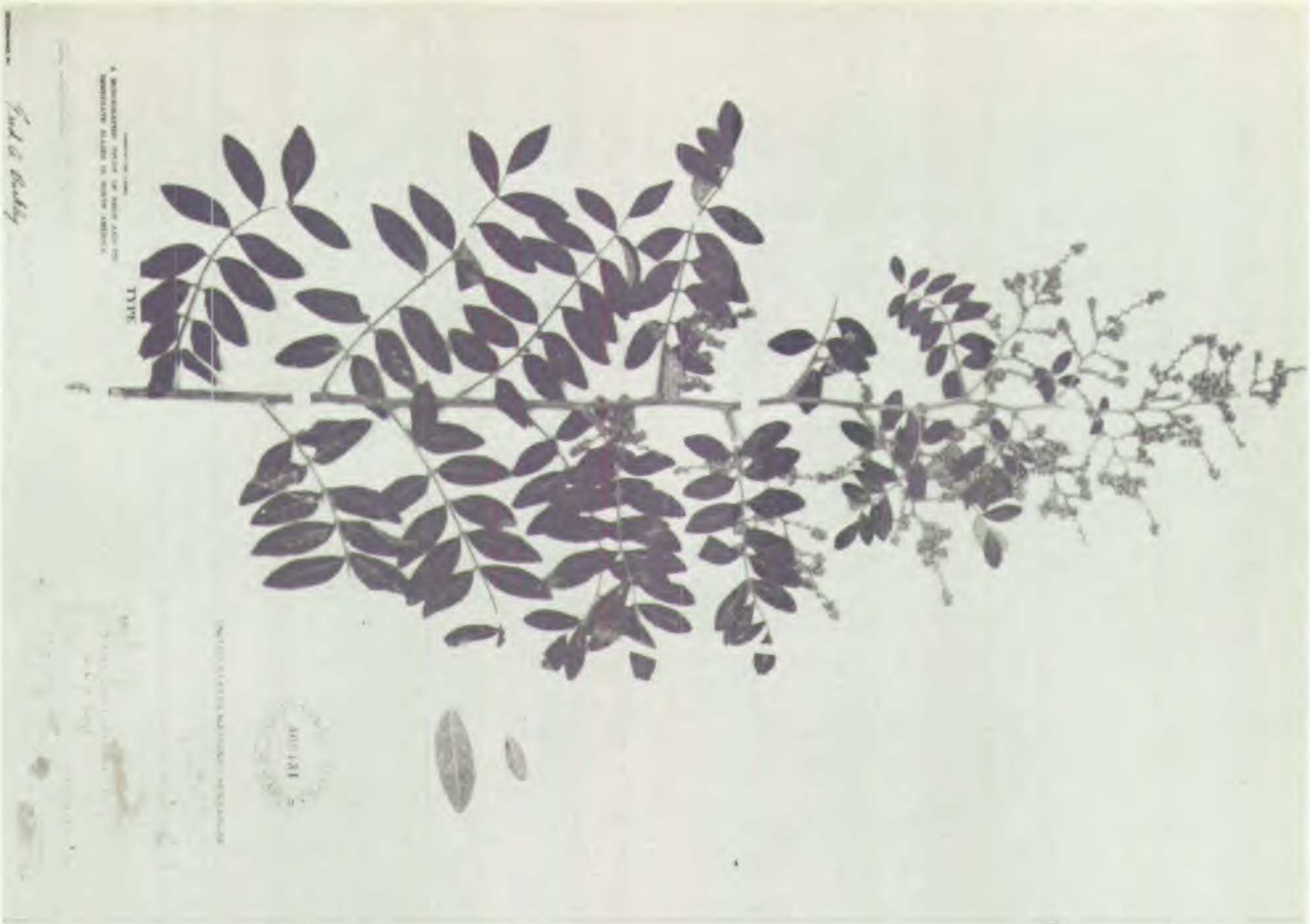
BARKLEY—THE RHUS-COMPLEX

Explanation of Plate

PLATE 18

Fig. 1. *Rhus Hartmanii* Barkley. From the type specimen, *Hartman 324,* December 12, 1890, from Oakridge Pass, Sonora, Mexico, in the United States National Herbarium.

Fig. 2. *Rhus Arsenei* Barkl. From the type specimen, *Arsène & Amable 1566,* August 1907, Acatzingo, District of Tepeaca, Puebla, Mexico, in the Missouri Botanical Garden Herbarium.



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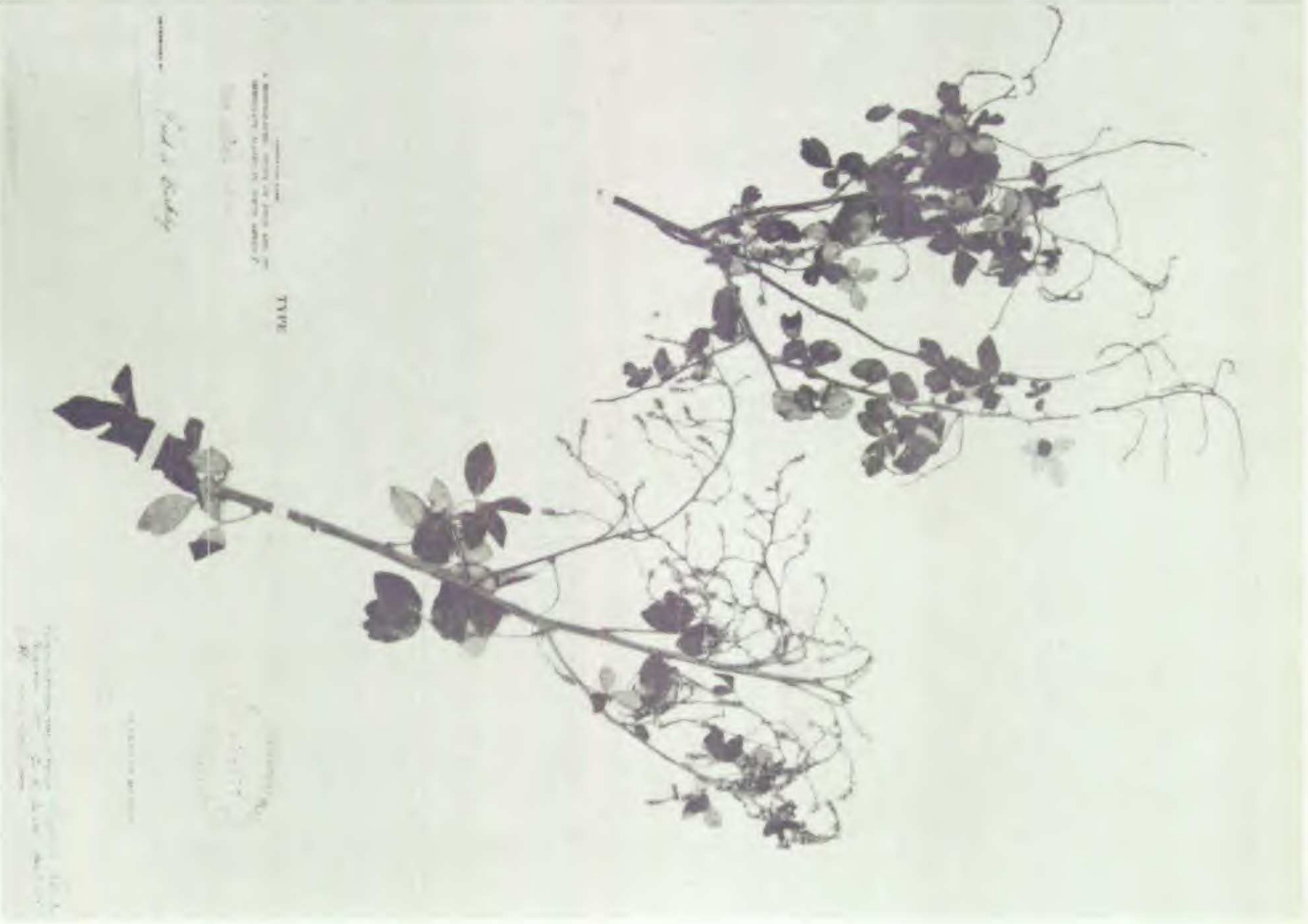


2

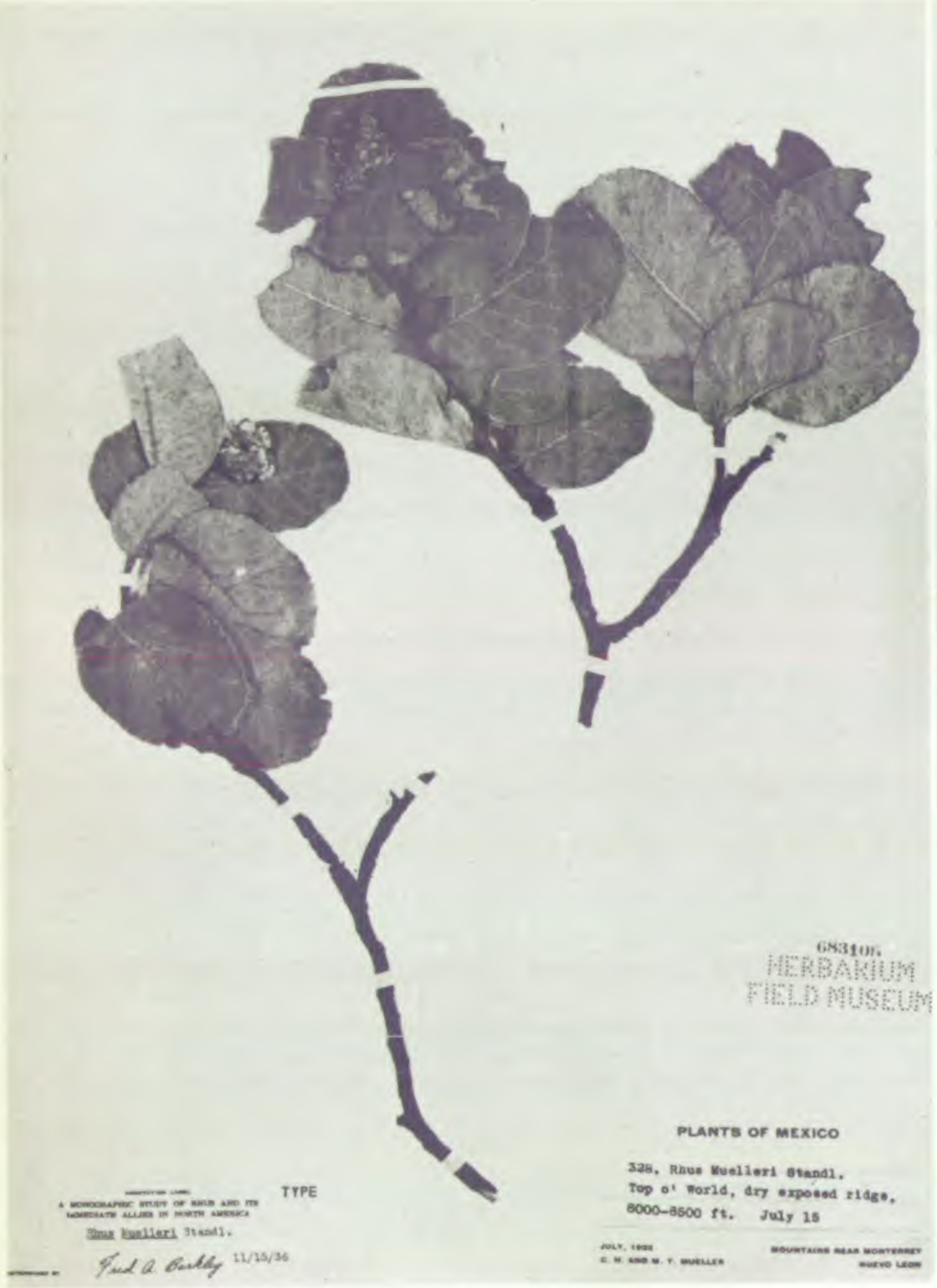
BARKLEY—THE RHUS-COMPLEX

EXPLANATION OF PLATE

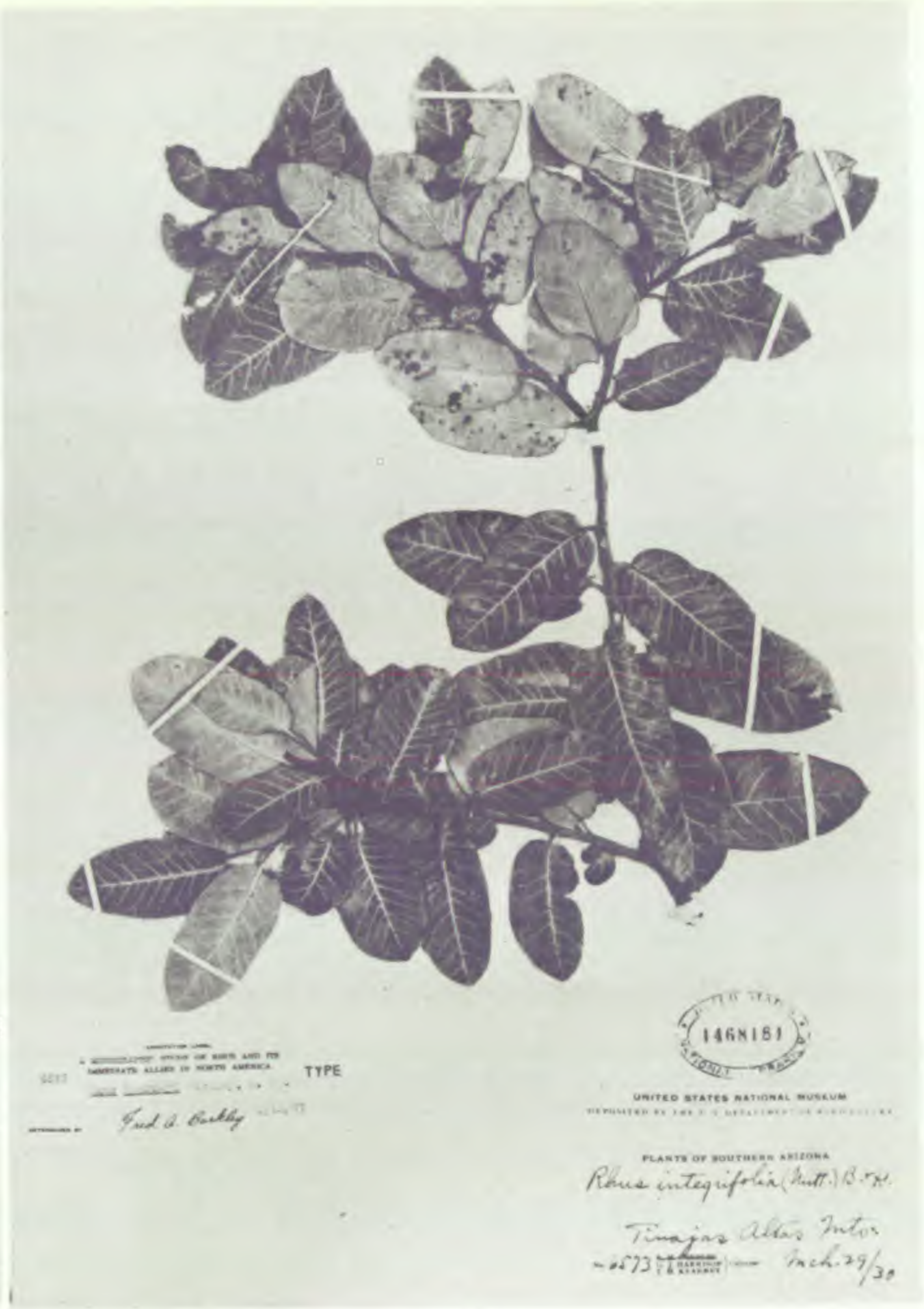
PLATE 19

Fig. 1. *Rhus Muelleri* Standl. & Barkl. From the type specimen, *C. H. & M. T. Mueller 328*, July 15, 1933, mountains near Monterrey, Nuevo Leon, Mexico, in the Field Museum Herbarium. Note the orbicular leaves, the short petioles, and the obscurely repand-serrate, revolute margins.

Fig. 2. *Rhus Kearneyi* Barkley. From the type specimen, *Kearney & Harrison 6573*, March 29, 1930, Tinajas Altas Mountains, Arizona, in the United States National Herbarium.


683106
HERBARIUM
FIELD MUSEUM
TYPE
A MONOGRAPHIC STUDY OF RHUS AND ITS
IMMEDIATE ALLIES IN NORTH AMERICA
Rhus Muelleri Standl.
Fred A. Barkley 11/15/36
PLANTS OF MEXICO
328. Rhus Muelleri Standl.
Top o' World, dry exposed ridge,
8000-8500 ft. July 15
MOUNTAINS NEAR MONTERREY
NUEVO LEON

1


1468181
TYPE
A MONOGRAPHIC STUDY OF RHUS AND ITS
IMMEDIATE ALLIES IN NORTH AMERICA
Fred A. Barkley
UNITED STATES NATIONAL MUSEUM
PLANTS OF SOUTHERN ARIZONA
Rhus integrifolia (Nutt.) B. & H.
Tinajas Altas Mtns
6573
Mch. 29/30

2

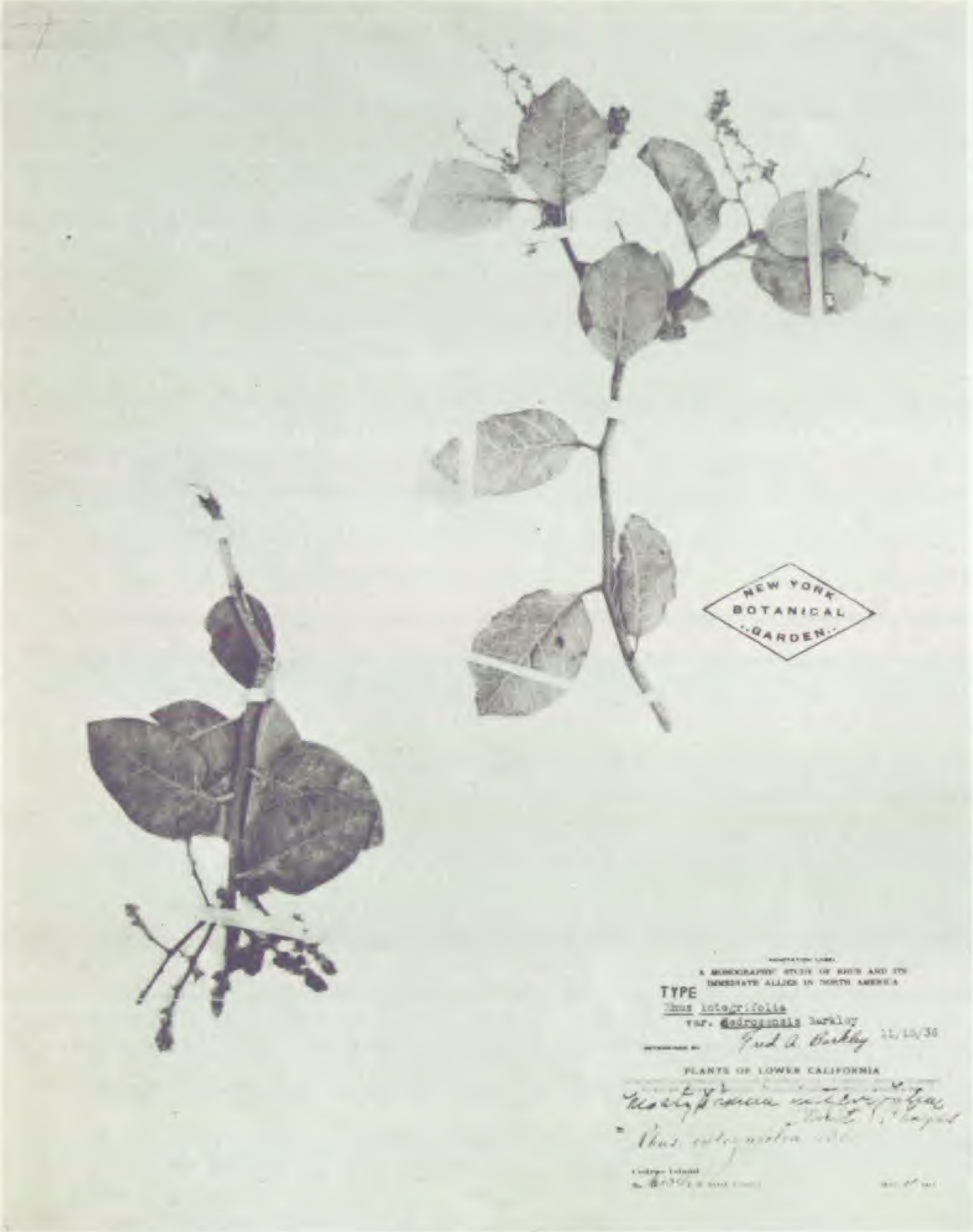
BARKLEY—THE RHUS-COMPLEX

Explanation of Plate

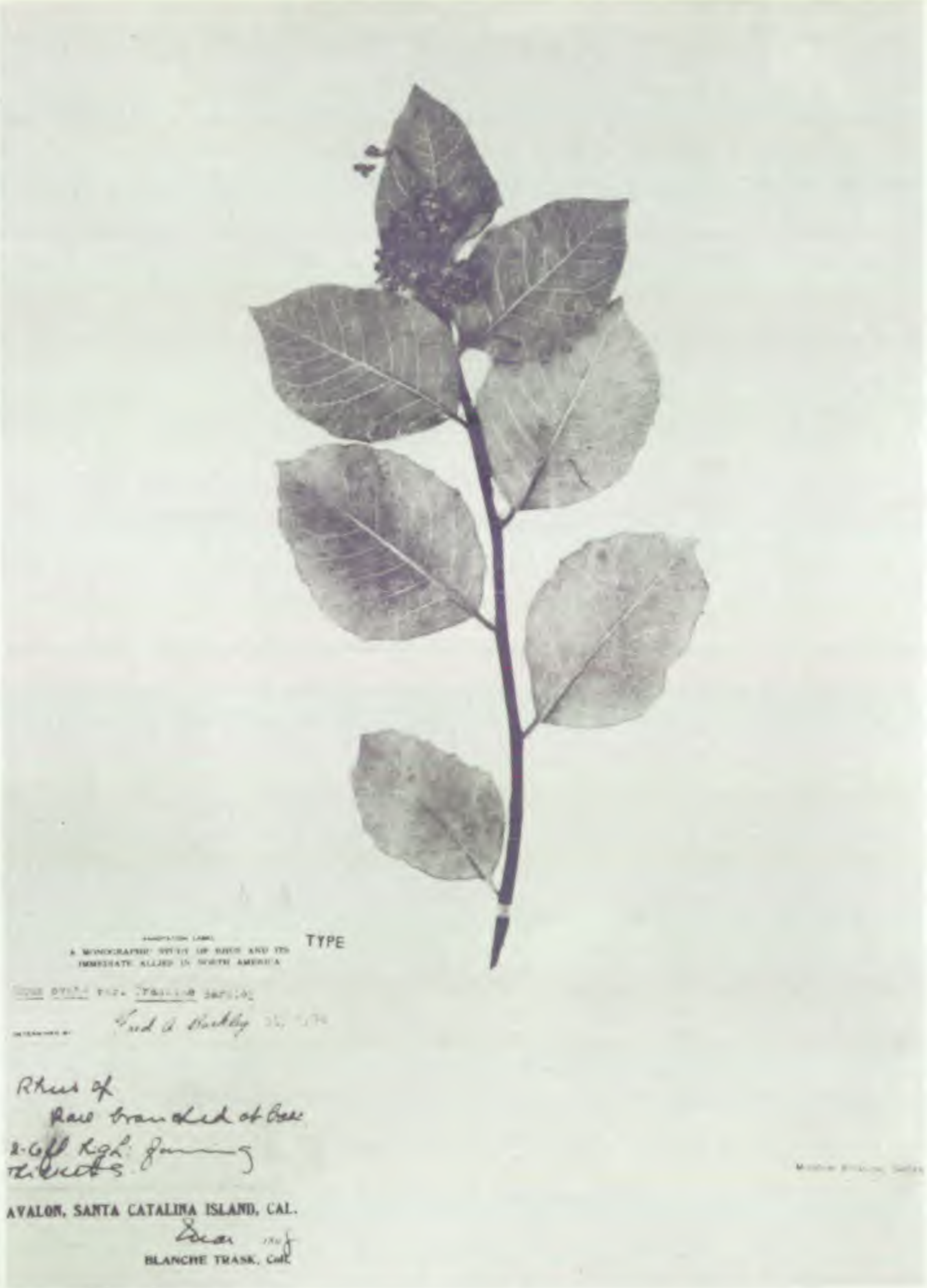
PLATE 20

Fig. 1. *Rhus integrifolia* var. *cedrosensis* Barkley. From the type specimen, *J. N. Rose 16134*, March 11, 1911, Cedros Island, Lower California, in the New York Botanical Garden Herbarium. Note the inflorescence and the leaf.

Fig. 2. *Rhus ovata* var. *Traskiae* Barkley. From the type specimen, *Trask*, March 1898, Avalon, Santa Catalina Island, California, in the Missouri Botanical Garden Herbarium.


NEW YORK BOTANICAL GARDEN
ANNOTATION LABEL
A MONOGRAPHIC STUDY OF RHUS AND ITS IMMEDIATE ALLIES IN NORTH AMERICA
TYPE
Rhus integrifolia var. cedrosensis Barkley
DETERMINED BY Fred A. Barkley 11/15/36
PLANTS OF LOWER CALIFORNIA
Cedros Island

1


ANNOTATION LABEL
A MONOGRAPHIC STUDY OF RHUS AND ITS IMMEDIATE ALLIES IN NORTH AMERICA
TYPE
DETERMINED BY Fred A. Barkley
Rhus of
AVALON, SANTA CATALINA ISLAND, CAL.
BLANCHE TRASK, Coll.

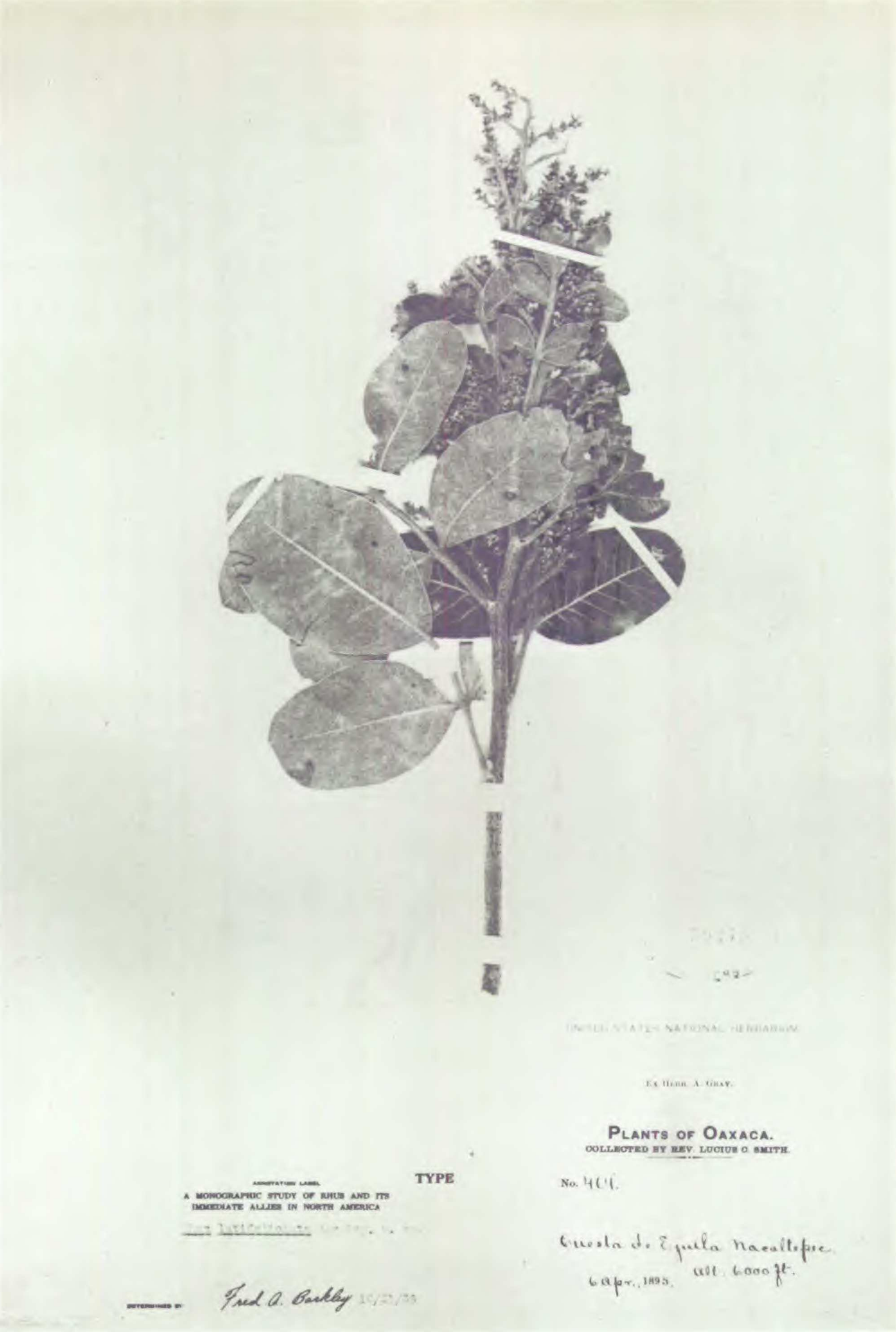
2

BARKLEY—THE RHUS-COMPLEX

EXPLANATION OF PLATE

PLATE 21

Rhus Duckeri Barkley. From the type specimen, *L. C. Smith 464,* April 6, 1895, Cuesta de Ejutla Nacaltepec, Oaxaca, Mexico, in the United States National Herbarium.


UNITED STATES NATIONAL HERBARIUM
EX HERB. A. GRAY.
PLANTS OF OAXACA.
COLLECTED BY REV. LUCIUS C. SMITH.
No. 404.
Cuesta de Ejutla Nacaltepec
alt. 6000 ft.
6 apr., 1895.
ANNOTATION LABEL
A MONOGRAPHIC STUDY OF RHUS AND ITS IMMEDIATE ALLIES IN NORTH AMERICA
TYPE
DETERMINED BY
Fred A. Barkley

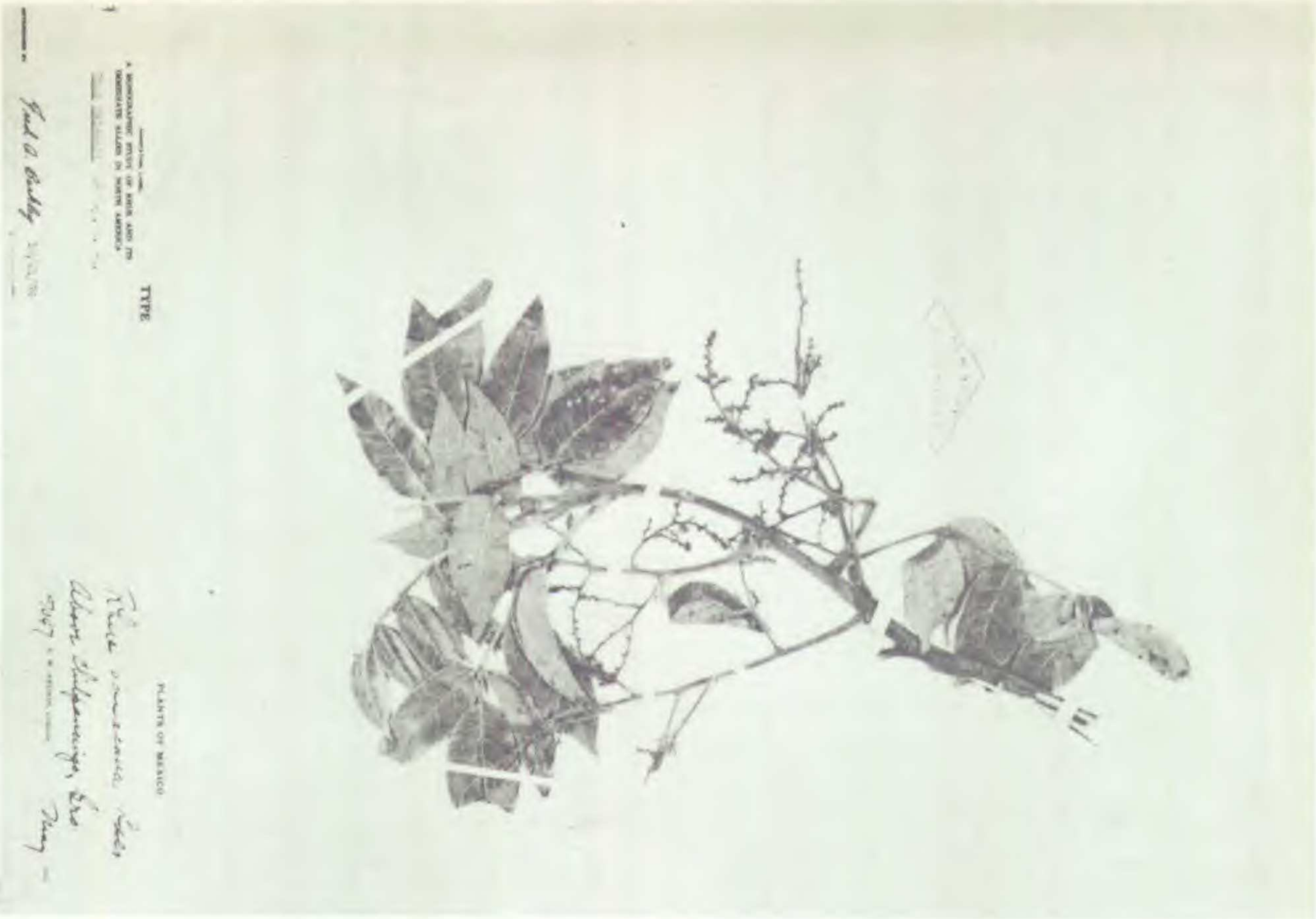
BARKLEY—THE RHUS-COMPLEX

Explanation of Plate

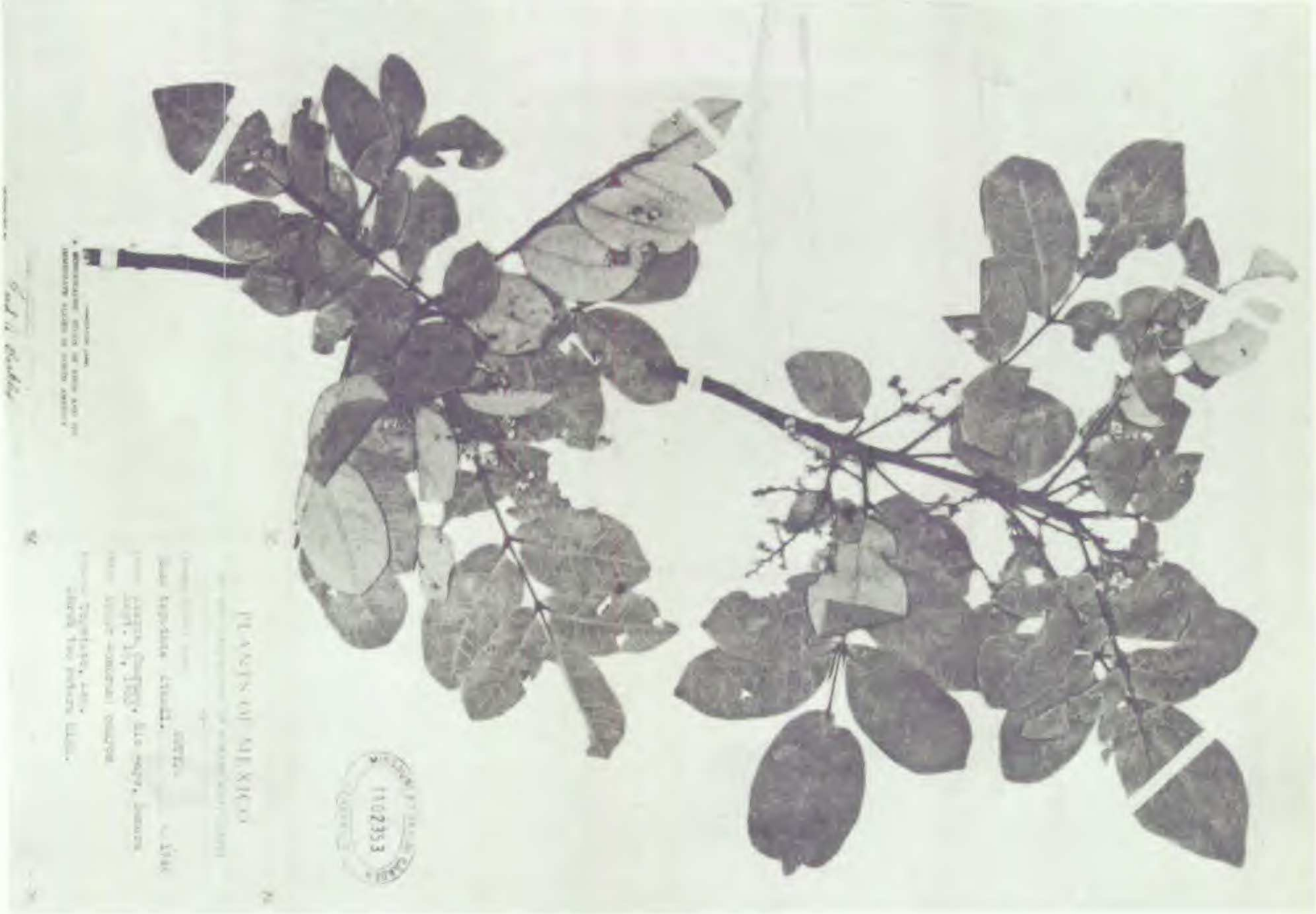
PLATE 22

Fig. 1. *Rhus Nelsonii* Barkley. From the type specimen, *E. W. Nelson 7047*, May 1903, above Chilpancingo, Guerrero, Mexico, in the New York Botanical Garden Herbarium.

Fig. 2. *Rhus Tepetate* Standley & Barkley. From the cotype specimen, *Gentry 1746*, September 10, 1935, Sierra Charuco, Rio Mayo, Sonora, Mexico, in the Missouri Botanical Garden Herbarium.


TYPE
PLANTS OF MEXICO

1


PLANTS OF MEXICO

2

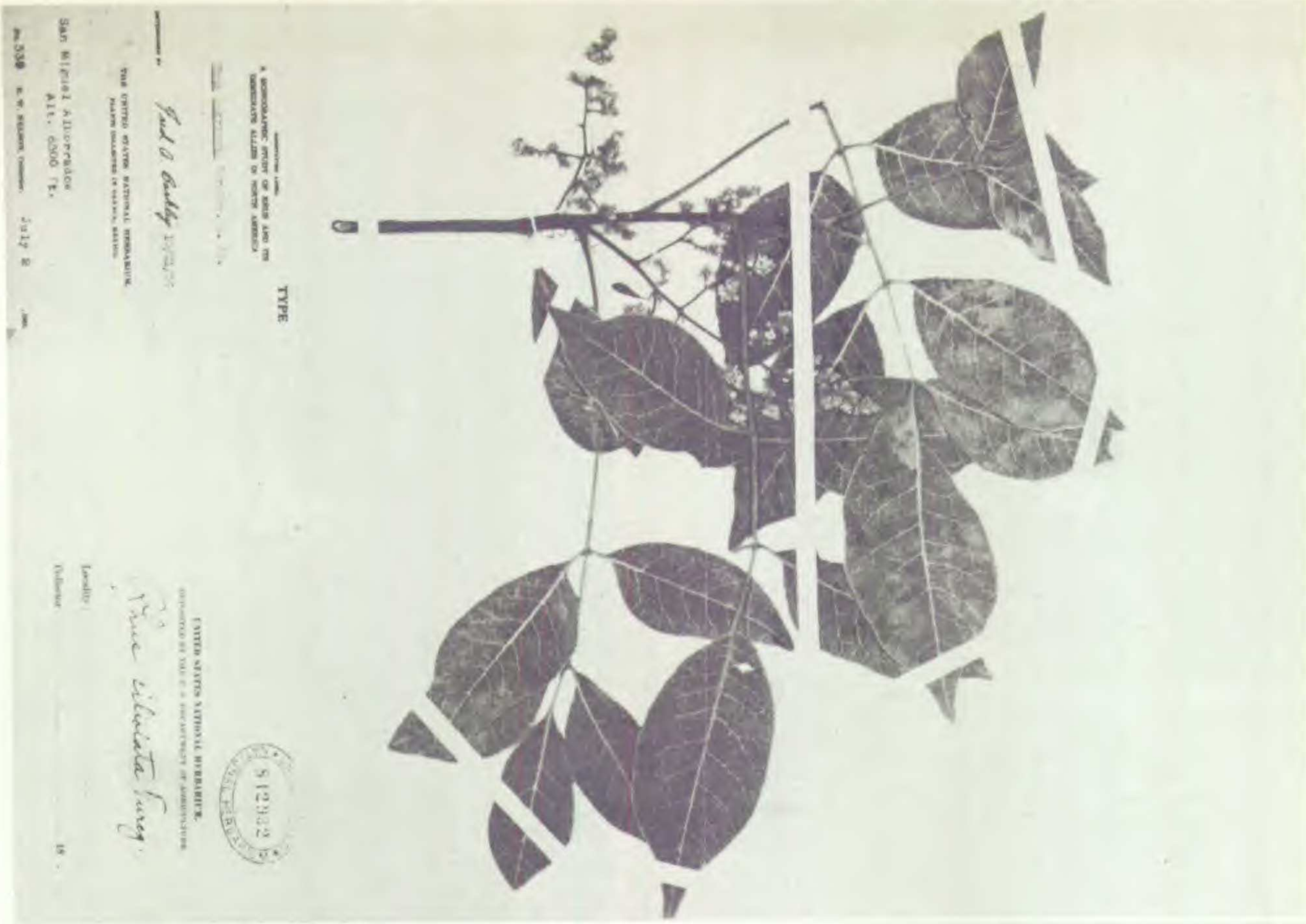
BARKLEY—THE RHUS-COMPLEX

Explanation of Plate

PLATE 23

Fig. 1. *Rhus macropoda* Barkley. From the type specimen, *E. W. Nelson 539*, July 2, 1894, San Miguel Alborrados, Oaxaca, Mexico, in the United States National Herbarium.

Fig. 2. *Rhus profusa* Barkley. From the type specimen, *Edw. Palmer 214*, October 15–21, 1902, near Los Caños, San Luis Potosi, Mexico, in the United States National Herbarium.


TYPE
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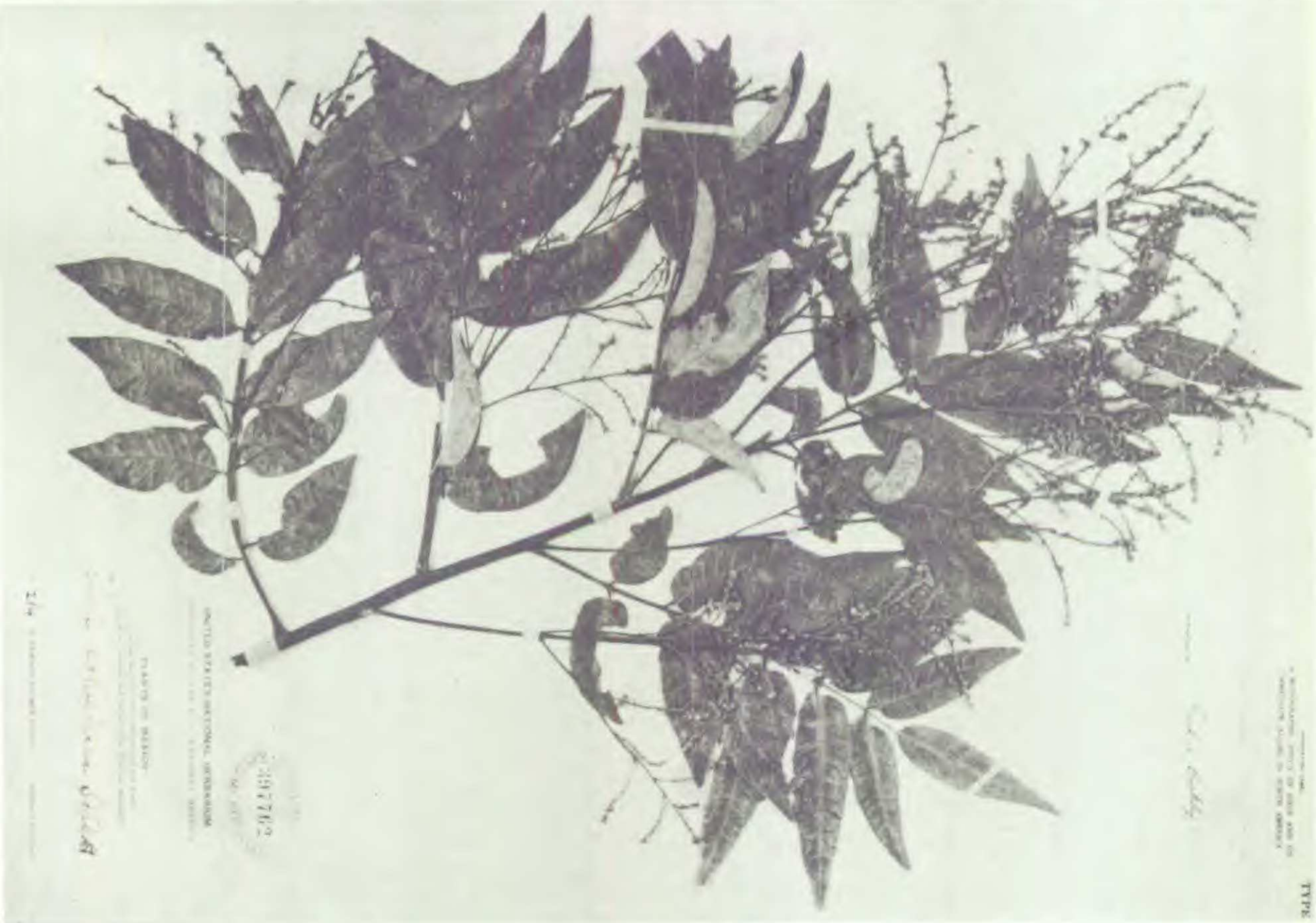


2

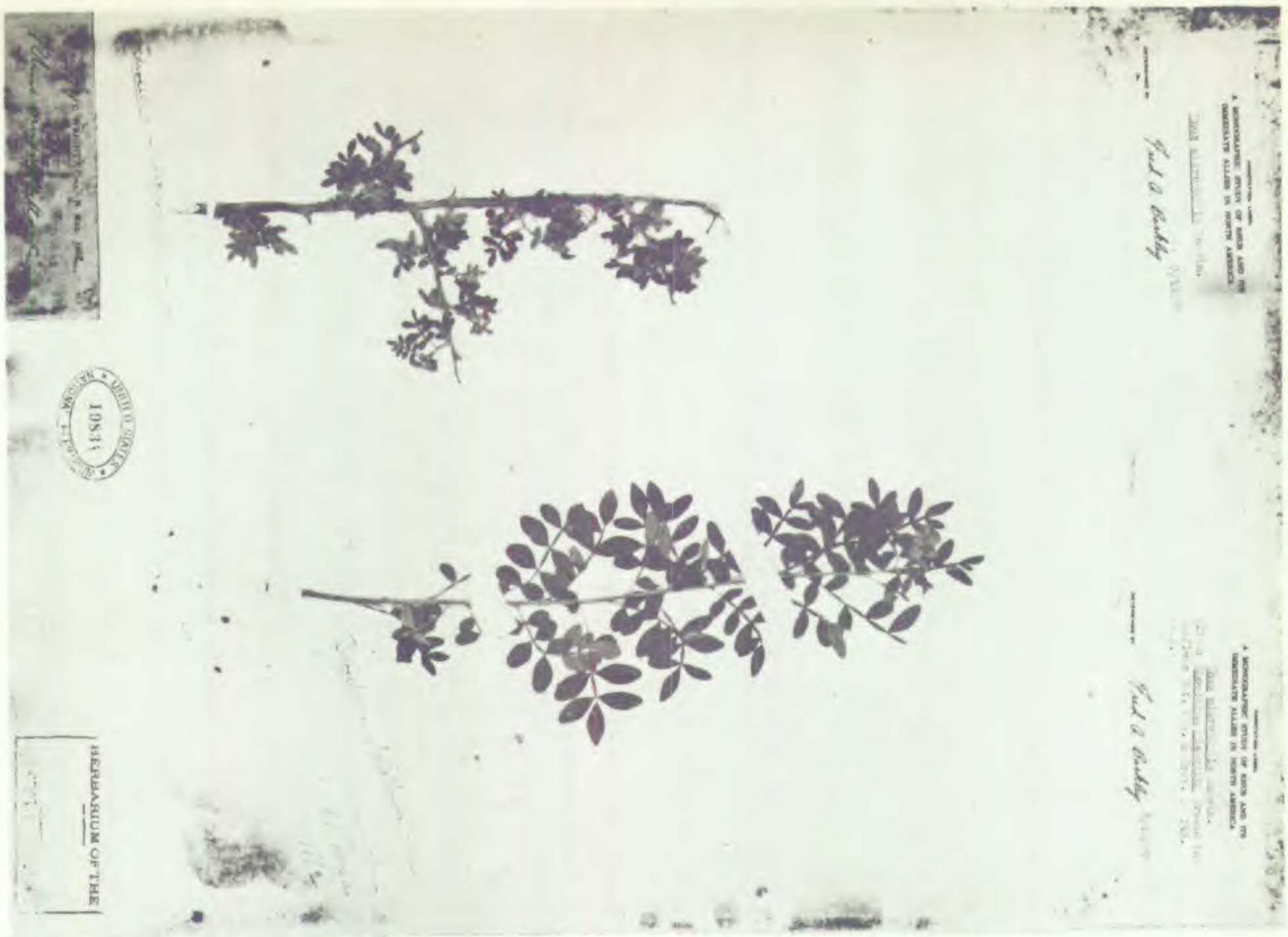
BARKLEY—THE RHUS-COMPLEX

EXPLANATION OF PLATE

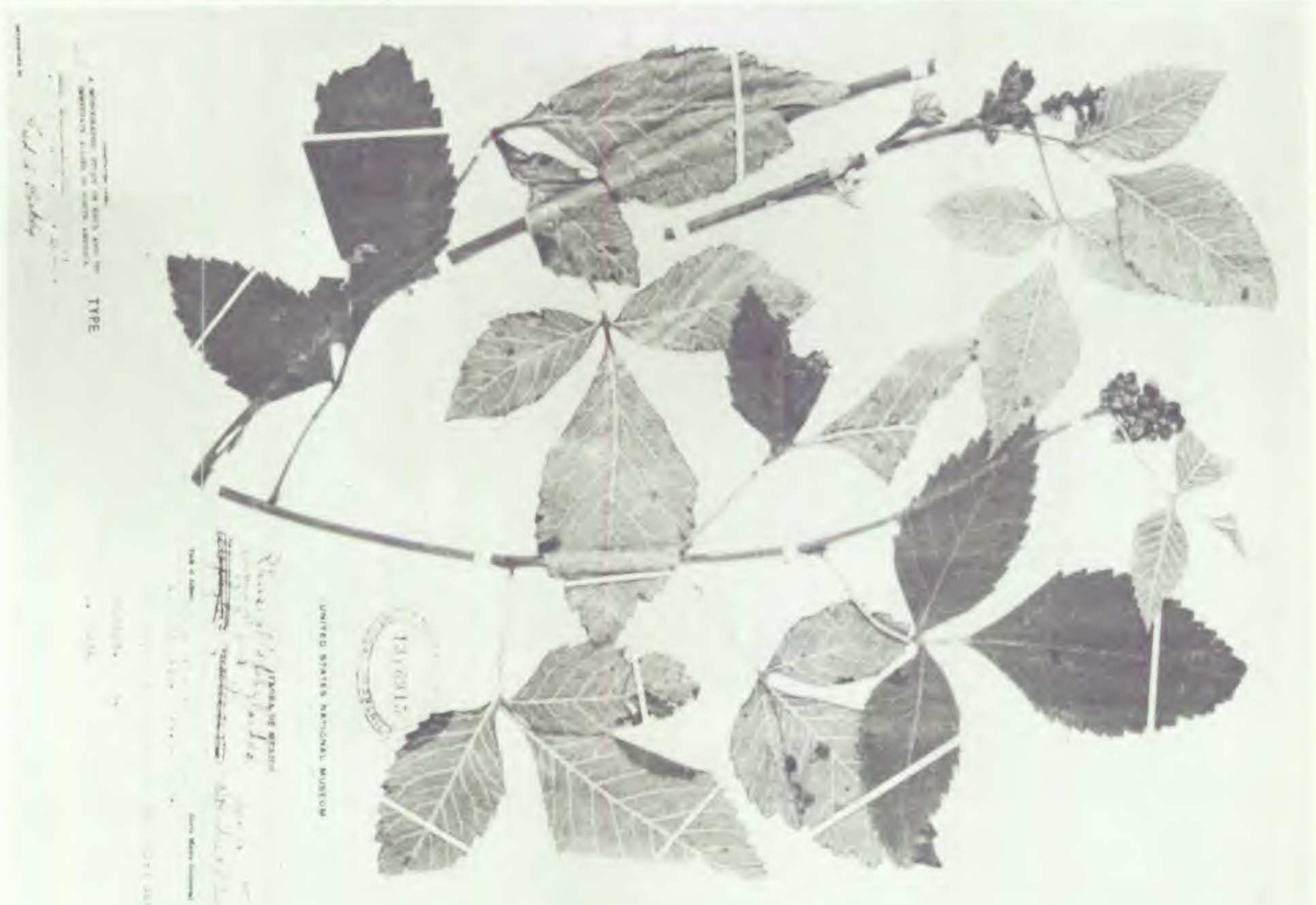
PLATE 24

Fig. 1. *Rhus microphylla* Engelm. The specimen, *C. Wright 1341*, 1852, N. Mex. (left), in the United States National Herbarium, appears to be the type, although *Lindheimer 734* was distributed as the type collection. The specimen on the right, *Reverchon*, 1882, from Fort Concho, Texas, is the type of *Rhoeidium glabellum* Greene. The two specimens show typical leaf variation.

Fig. 2. *Rhus allophylloides* Standl. From the type specimen, *Mexia 1640*, February 4, 1927, trail from San Sebastian to Real Alto, Jalisco, Mexico, in the United States National Herbarium.


HERBARIUM OF THE
19831

1


TYPE
UNITED STATES NATIONAL MUSEUM

2

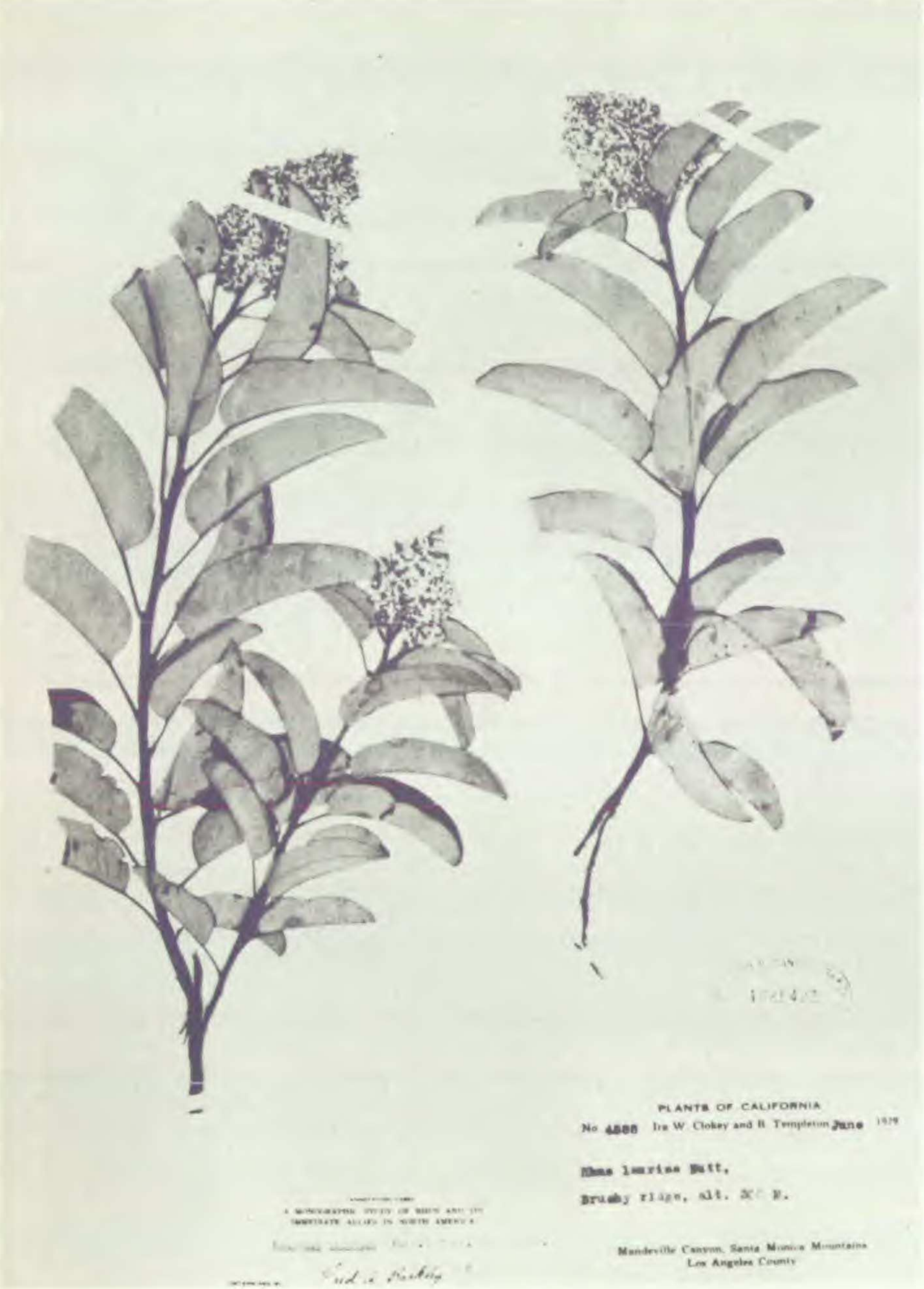
BARKLEY—THE RHUS-COMPLEX

EXPLANATION OF PLATE

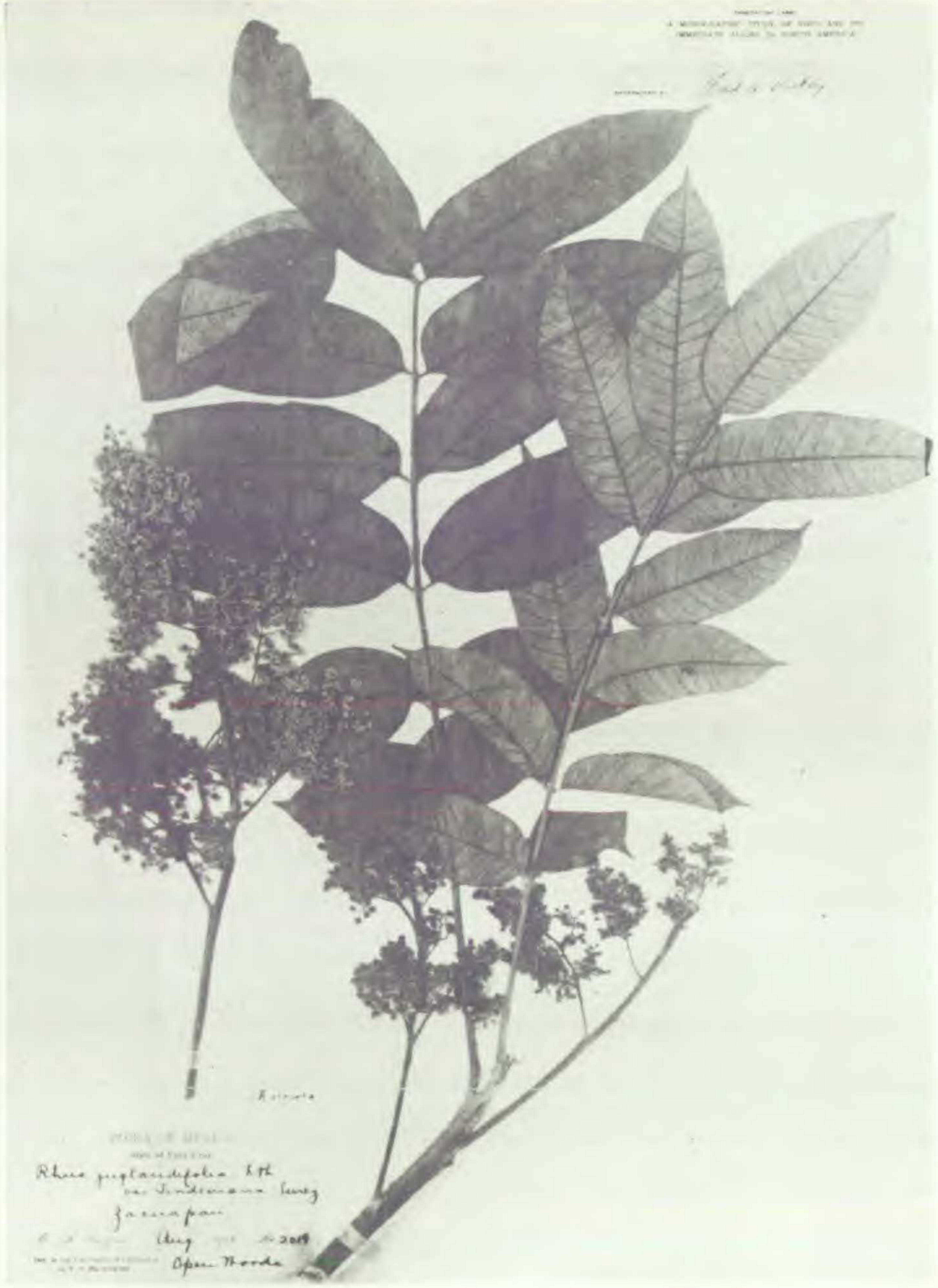
PLATE 25

Fig. 1. *Malosma laurina* (Nutt.) Nutt. ex Engler. Note the simple, long-petiolate leaves which fold along the midribs, and the dense terminal thyrsus.

Fig. 2. *Toxicodendron striata* (Ruiz & Pav.) Kuntze.


PLANTS OF CALIFORNIA
No 4888 Ira W. Clokey and B. Templeton June 1929
Rhus laurina Nutt.
Brushy ridges, alt.
Mandeville Canyon, Santa Monica Mountains
Los Angeles County
Fred A. Barkley

1


Fred A. Barkley
Rhus juglandifolia HBK
var. Lindeniana
Jacarapan
Aug
No 2019
Open Woods

2

BARKLEY—THE RHUS-COMPLEX

EXPLANATION OF PLATE

PLATE 26

Fig. 1. *Toxicodendron quercifolia* (Michx.) Greene.

Fig. 2. *Toxicodendron radicans* (L.) Kuntze. This specimen, collected by Fendler in New Orleans, April 16, 1846, shows the leaf variation typical on plants of this species. Note also the lateral panicles.